Kootenai National Forest

July 1986

NOXIOUS WEED TREATMENT PROGRAM F.E.I.S.

PLEASE RETURN

FINAL ENVIRONMENTAL IMPACT STATEMENT

KOOTENAI NATIONAL FOREST

NOXIOUS WEED TREATMENT PROGRAM

Lincoln County, Montana

Type of Action	Administrative
Responsible Federal Agency	Forest Service, U.S.D.A.
Responsible Official	James F. Rathbun, Forest Supervisor Kootenai National Forest 506 Hwy. 2 West Libby, Montana 59923
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Abstract: This Environmental Impact Statement (EIS) documents the analysis of three alternatives, including No Action, which were developed for the management and treatment of noxious weeds on the Rexford and Fortine Ranger Districts of the Kootenai National Forest.

Alternatives: (1) Integrated pest management including use of herbicides (Proposed Action). (2) Control without the use of herbicides. (3) No action (No effort would be made to control or contain the spread of noxious weeds on the Forest). Alternative 1 is the preferred alternative. Significant environmental impacts of the preferred alternative would be to prevent a major weed infestation from occurring on National Forest lands, thus protecting the productivity and unique character of the lands, and eliminating them as a source of infestation to nonpublic lands.

SUMMARY

This Final Environmental Impact Statement (FEIS) describes and analyzes the environmental impacts of implementing a program for controlling noxious weeds on the Rexford and Fortine Ranger Districts of the Kootenai National Forest, Montana. In accordance with the National Environmental Policy Act, this FEIS identifies impacts on the natural and human environment of three alternatives. The preferred alternative would use an integrated approach to control noxious weeds.

Alternatives

The proposed program for controlling noxious weeds would involve coordination with the state, county, and private landowners to ensure that safety factors are adequate, and that efforts are not wasted.

Manual, mechanical, cultural, biological, and chemical methods of control are considered for use under Alternative 1. Alternative 2 excludes the use of herbicides, while Alternative 3 would provide no attempt to control noxious weeds.

Alternative 1 - Proposed Action. All approved methods of noxious weed control, excluding aerial application of herbicides, and burning, would be used in an integrated program. Average annual treatments throughout the EIS area would typically not exceed 25 acres. Cultural treatments, and various preventive strategies would be imposed to limit new infestations.

Alternative 2 - No use of herbicides. Alternative 2 would not allow use of herbicides, but all other treatments could be used. Average annual treatment would typically include about 10 acres. Cultural treatments and various preventive strategies would be implemented to curtail new infestations.

Alternative 3 - Under Alternative 3, no attempt would be made to control noxious weeds. Any control would only be a natural function of the environment with no planned intervention by land management actions.

Environmental Consequences

Air Quality - There would be no negative impacts on air quality from the selected treatments. Burning as a method of control has not achieved favorable results, and is not feasible with the scattered nature of the infestations, and will not be proposed.

Soils - Under Alternatives 1 and 2, hand grubbing or tilling would result in short term, slight increases in erosion. The persistence of herbicides in soils would be short term due to the amounts of organic matter, and warm moist conditions which occur in the project areas. No soil sterilization would occur.

Water Resources - There is slight potential for herbicides to affect water quality from spray drift or surface runoff. With the mitigation provided, such

as buffer strips, minimum application rates, hand and wick applicators and the small amounts of acreage to be treated, there is little opportunity to adversely affect water quality of either surface or ground water. The small amounts of tillage or hand grubbing will not significantly increase suspended sediments or dissolved solids.

Vegetation - Alternative 1 would improve the ecological condition of Forest lands and reduce the spread of noxious weeds to noninfested lands. Alternative 3 would allow noxious weeds to spread unchecked. The spread of noxious weeds, in turn, would result in (1) a decline in habitat ecological condition, and (2) the infestation of adjacent lands, contributing to a decline in productivity. Alternative 2 would result in impacts similar to those of Alternative 3, where manual, mechanical, and biological methods do not control noxious weeds.

Animals - Alternative 1, and to some extent Alternative 2, would benefit livestock by restoring forage on treated lands, and by preventing further loss of available forage on adjacent lands. Alternative 3 would harm livestock by allowing available forage to decrease, forcing livestock to use less desirable forage, possibly poisonous species, and to overuse areas where desirable forage remains.

Under Alternative 1, wildlife may suffer short term adverse impacts from the loss of non-target vegetation used for cover or food. However, the quality of habitat should improve after treatment. Preventive measures such as grass and forb seeding and fertilization should also enhance the quality of game habitat.

Alternative 3, and to some extent Alternative 2, will allow for continued loss of forage and decreased wildlife diversity. Fish populations would not be adversely affected by any alternative.

Cultural Resources - Appropriate measures would be taken to identify and protect cultural sites, under Alternatives 1 and 2, where ground disturbance would take place. Under both alternatives, sites found before disturbance occurred would be protected, and alternative methods used on the project cancelled.

Visual Resources - Scenic degradation would be slight to non-existent under Alternatives 1 and 2. Alternative 3, by allowing noxious weeds to spread uncontrolled would gradually have an adverse effect on visual quality.

Recreation - Alternatives 1 and 2 would benefit recreation areas infested with noxious weeds, by reducing exposure of recreationists to the undesirable characteristics such as burrs, thistles, odors, or allergy-causing agents. Alternative 3 would cause a decline in recreation by allowing noxious weeds to spread, thus limiting the total potential area available or desirable for recreation.

Wilderness Study and Resource Natural Areas - Wilderness character can be affected by the spread of noxious weeds and could pass unnoticed until infestations were widespread. The successful competition of these plants would eventually decrease the diversity and vigor of the naturally occurring vegetation. As more visitors and recreation livestock travel through the wilderness, the chances of spread increase. Alternatives 1 and 2 would provide control of exotic weeds introduced into these areas. Alternative 3, would allow for unchecked spread of noxious weeds, which could replace native plants,

altering the character of the area. Forest Service policy allows chemical or hand-grubbing control for noxious weeds. Such a program would require Regional Forester approval. There is no proposed treatment plan for the Ten Lakes Wilderness Study Area.

Social and Economic Conditions - The economic and social effects of spreading noxious weeds is often difficult to access as the costs are often hidden, and the effects tend to be cumulative. Current loss of AUM's (animal unit months) on the Fortine and Rexford Districts is rather small due to the small acreages and spotty infestations, but the potential loss could be devastating to the permittees who rely on the forage produced on National Forests, if weeds are left unchecked. This loss of production, and increased costs of control, would also spread to private lands, causing additional financial stress on ranchers during a period of severe economic depression in the agricultural and forest products industries.

Loss of wildlife habitat, and associated recreational opportunities, would cause a loss of revenue to the communities which rely on recreational dollars.

Alternatives 1 and 2 would create some conflict due to the range of attitudes and concerns on the use of herbicides and on prevention measures which would place restrictions on Forest users. Alternative 3, would agitate private landowners and state and county agencies who see the Forest Service ignoring its responsibilities in controlling the spread of noxious weeds on National Forest lands.

TABLE OF CONTENTS

CHAPTER 1 - PURPOSE OF AND NEED FOR ACTION

1. INTRODUCTION

The Kootenai National Forest proposes to implement a program for controlling or eradicating noxious weeds on public lands at the Rexford and Fortine Ranger Districts.

Noxious weeds are rapidly spreading throughout the State of Montana, causing a variety of major ecological impacts to both agriculture and wild lands. As a result, crop yields are being reduced, rangeland in good ecological condition is being invaded, and wildlife habitat is being reduced (French and Lacey, 1983). Economic loss from noxious weeds is considerable and runs into the millions of dollars annually.

The term "noxious weed" is defined as any living stage (including but not limited to seeds and reproductive parts) of any parasitic or other plant of a kind, or subdivision of a kind, which is of foreign origin, is new to or not widely prevalent in the United States, and can directly or indirectly injure crops; other useful plants; livestock or poultry; other interests of agriculture, including irrigation; navigation; fish and wildlife resources of the United States; or the public health (Federal Noxious Weed Act of 1974).

Noxious weeds cannot be adequately controlled unless federal, state, county, and private interests work together in controlling weeds using effective and efficient means (Spoon, et al 1983).

Two federal laws direct weed control on federal lands: The Carlson-Foly Act (PL.90-583) and the Federal Noxious Weed Act (Pl.93-629), found in Appendix A. State and county laws also place responsibility for noxious weed control on federal land with the federal government.

Spotted knapweed (Centaura maculosa) has been found at 45 locations on the two districts, the majority found along road rights-of-way. Estimates run about 60+ acres affected, though this is undoubtedly low. Dalmation toadflax (Linaria dalmatica), Canada thistle (Cirsium arvense), Houndstongue (Cynoglossum officinale) and Goatweed (Hypericum perforatum) are found on numerous sites throughout the two districts. Leafy spurge (Euphorbia esula) has been identified on adjacent private lands, and may pose a threat if preventative measures are not taken.

These weed species have a variety of adverse effects on resources of the land, reducing economic return and aesthetic qualities. Forage production is reduced, affecting both big game populations and livestock production. Habitat quality for fish, small game, and bird populations is lowered. Natural meadows invaded by noxious weeds lose visual quality and appeal for recreation use. These weeds compete with shrubs and young trees for nutrients and moisture and affect seedling survival and growth.

2. ISSUES AND CONCERNS

Issues and concerns identified in the scoping process were associated with herbicide use, alternative treatment methods, insufficient control of noxious weeds, and potential effects on human health and the environment.

3. DESCRIPTION OF WEED SPECIES (MSU, 1985)

a. Leafy spurge - This weed has not yet been discovered on the Forest, but has been introduced to adjacent private lands. It is considered to be the most persistent noxious weed in Montana. It is a competitive, aggressive perennial which is difficult and expensive to control. It has deep, tenacious root systems, the capacity to sprout from root segments, and has underground buds and seed which can remain viable for many years. Leafy spurge contains a toxin that can cause toxic effects in animals from either internal or external exposure. Leafy spurge has allelopathic properties, ie., the weed releases chemicals that inhibit the growth of other plants in the same area. It has wide habitat suitability ranging from prime agricultural land to low productive rangeland sites.

b. Spotted knapweed is a biennual or short-lived perennial plant which reproduces only by seed, yet is able to invade a wide variety of habitats. This is the key target species for control efforts on the Rexford and Fortine Districts. Flowers are usually purple and the outer row of bracts under the head have black, fringed tips. It produces seed even with below normal precipitation, and then rapidly invades areas where other vegetation is weakened by drought. The late fall and early spring growth pattern gives it a competitive advantage over many native plants. In addition this weed produces an allelopathic toxin (cnicin) that inhibits the germination and root growth of native grasses and trees. This compound may be deposited by knapweed into the soil, reducing the competition from associated vegetation, suppressing normal plant succession, and allowing the development and perpetuation of a weed monoculture.

c. Canada thistle is an introduced, deep-rooted, perennial forb. This spiny plant reproduces by seeds and creeping rootstocks that spread laterally 12 to 15 feet in a single year. The shoots form on these roots each year. Its grooved stems are 2 to 5 feet tall, and branch near the top. The waxy leaves are oblong to lance shaped and can be very irregular and deeply cut with spiny to smooth margins. The flower heads are small, numerous and vary from light lavender to rose-purple. It grows in cultivated fields, meadows, pastures, and waste places. It is common along logging roads and clearcuts.

d. Dalmation toadflax is a member of the snapdragon family. It is a perennial forb that spreads by creeping roots and seed. The plants are usually about 2 feet tall, pale green and have very showy yellow flowers. The leaves are broad, heart-shaped and clasp the stem. Dalmation toadflax is an escaped ornamental that invades rangeland, mountain meadows, and waste places. It is very difficult to control.

e. Goatweed is a perennial forb. It reproduces by seed and rootstock. Stems are smooth, branched, about 3 feet tall and woody at the base. The opposite leaves are elliptic to oblong and have small, glandular dots. The orange-yellow flowers are about 3/4 inch in diameter and five-petaled. The three-parted seed pods are round, pointed and contain many seeds. Goatweed invades meadows, dry pastures, roadsides, and neglected fields. Goatweed causes photosensitization in livestock and is regarded as a poisonous plant.

f. Houndstongue is a biennial forb in the borage family. The plant spends the first year as a rosette but produces a stem that is 8 to 30 inches tall in the second growing season. Its basal leaves are broad, lance-shaped, have prominent veins and are covered with soft white hair. The small purple or pinkish flowers produce seed clusters that contain three to four seeds. The seed is encased in a hard husk covered with barbs. These barbs are easily attached to clothing, hair and wool. Houndstongue plants are usually found on disturbed sites, railroad rights-of-way, and along roads and trails.

Those weed species previously listed, are those currently identified as a problem on the Kootenai National Forest. Outbreaks of any new weed species, reported through the County Extension office, will be added to the list of species currently being inventoried.

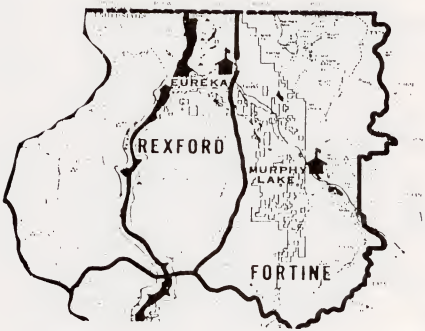
TABLE 1-1

Additional Weeds Considered Noxious in Montana:

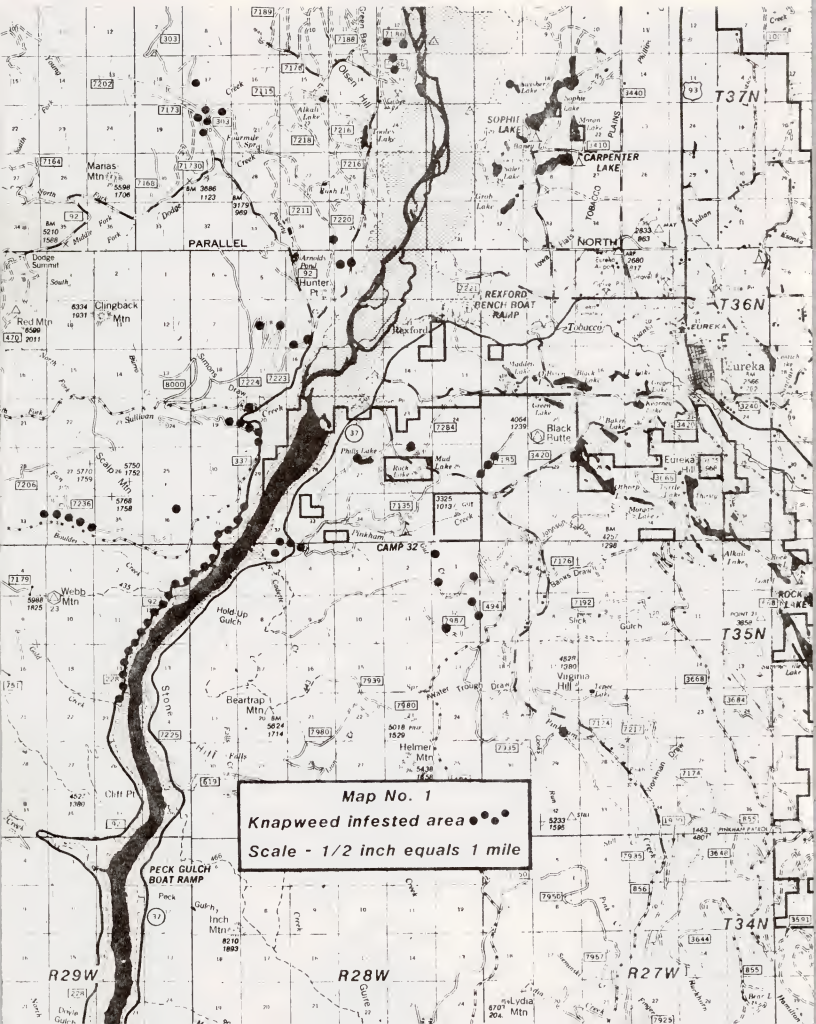
Field Bindweed	Convolvulus arvensis
White Top	Cardaria draba
Russian Knapweed	Centaurea repens
Diffuse Knapweed	Centaurea diffusa
Dyers Woad	Isatis tinctoria
Yellow Starthistle	Centaurea solstitialis
Common Crupina	Crupina vulgaris
Burdock	Arctium minus
Tansy Ragwort	Senecio jarcobaea
Eurasian Watermilfoil	Myriophyllum spicatum
Mush Thistle	Carduus nutans
Yellow Toadflax	Linaria vulgaris

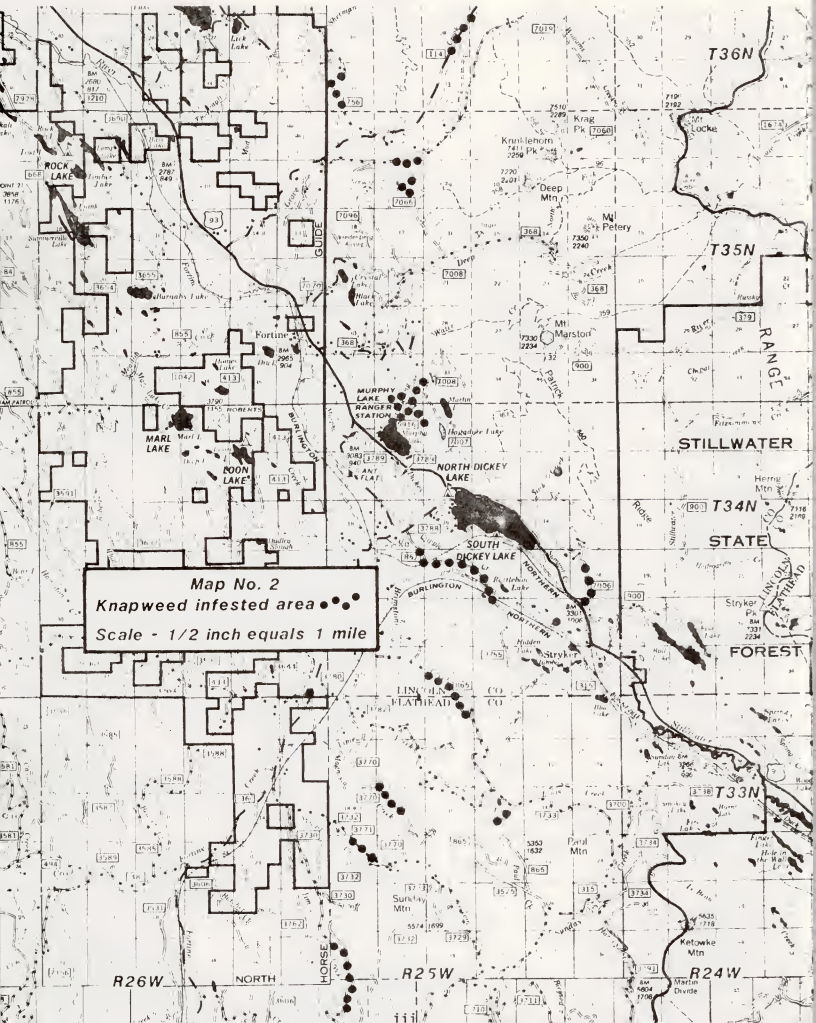
Taken from Lincoln County Integrated Noxious Weed Plan.

VICINITY MAP



KEY MAP


Map No. 1
Knapweed infested area
Scale - 1/2 inch equals 1 mile
PARALLEL
NORTH
REXFORD BENCH BOAT RAMP
Rexford
Tobacco
Eureka
CAMP 32
PECK GULCH BOAT RAMP
SOPHIE LAKE
CARPENTER LAKE
Black Butte
Hunter Pt
Webb Mtn
Beartrap Mtn
Helmer Mtn
Virginia Hill
Red Mtn
Clingback Mtn
Dodge Summit
Hold Up Gulch
Cliff Pt
Lydia Mtn
ROCK LAKE
T37N
T36N
T35N
T34N
R29W
R28W
R27W


Map No. 2
Knapweed infested area
Scale - 1/2 inch equals 1 mile
T36N
T35N
T34N
T33N
R26W
R25W
R24W
NORTH
STILLWATER
STATE
FOREST
RANGE
ROCK LAKE
GUIDE
Fortine
MARL LAKE
BOON LAKE
MURPHY LAKE RANGER STATION
NORTH DICKEY LAKE
SOUTH DICKEY LAKE
BURLINGTON NORTHERN
Knullehorn Mtn
Deep Mtn
Krag Pk
Mt Petery
Mt Marston
Locke
Stryker
Ketowke Mtn
Sunday Mtn
Baril Mtn
Martin Divide
HORSE
LINCOLN CO
FLATHEAD CO

CHAPTER 2 - DESCRIPTION OF ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter presents the alternatives considered by the Forest Service including the Proposed Action and a description of the preventive measures, treatment methods, and protective measures that would be used in a noxious weed management program.

Alternative 1 - Integrated Management (The Proposed Action)

Under this integrated approach, managers would use a combination of herbicide, manual, mechanical, or biological methods to treat noxious weeds on the Rexford and Fortine districts. Approximately 60 acres of spotted knapweed have been identified for treatment by ground application of picloram, 2,4-D, or dicamba.

The area to be treated and the rate of application to be applied are specified by project in Appendix B, Table 1, (Proposed Ground Application of Herbicides). Ground application of herbicides will be accomplished by spot treatment from vehicle mounted sprayers, backpacks, or wick application. Pelleted beads may be used in areas remote from roads and/or water. Approximately 20 acres would be treated annually at current funding levels.

The herbicides would be applied in coordination with control efforts of the Lincoln County weed board and adjacent state and private landowners. Herbicide application on National Forest lands may be carried out by the county weed district crew.

Dalmation toadflax, houndstongue and Canada thistle infestations will be inventoried, and treated either by hand or with ground application of herbicides, depending on the location, acreage, or mitigating factors.

Biological control efforts will be encouraged with additional release of spotted knapweed seed-head flies, and new releases of root mining moths when they become available.

Preventive measures would be applied in order to slow up or prevent further outbreaks of noxious weeds into new areas.

Alternative 2 - No Use of Herbicides

Under this alternative, herbicides would not be used under any circumstances, and the use of manual, mechanical, and biological measures would be increased. The locations and acreages to be treated are specified in Appendix B, Table 2, Proposed Manual or Mechanical Treatment. Approximately 10 acres would be treated annually, based on the same funding level as under Alternative 1. Re-treatment would be required for several years due to numbers and viability of seed remaining in the soil. As in Alternative 1, preventive measures would be applied in order to slow up or prevent further outbreaks of noxious weeds into new areas.

Alternative 3 - No Action

Under this alternative no attempt will be made to control or contain the spread of noxious weeds from entering or leaving National Forest lands. There would be no cooperation with the county or private landowners in their on-going weed control efforts, and compliance with federal and state laws would not be met.

Weed Management Treatments

Pre-treatment surveys were conducted on the sites listed in Appendix B. The surveys took in all feasible treatments, including potential impacts, effectiveness, and cost. Information from the surveys were used as a basis for prescribing noxious weed treatments.

Special provisions for treatments will be selected according to the scope of the action, accepted mitigation measures, and the physical characteristics of the specific site.

Surveys will be completed on additional sites identified in the future.

Prior to any vegetation treatment or ground disturbance, a survey of the project site for plants and animals listed or proposed for listing as threatened, endangered, or of special interest (Appendix F), will be conducted. If a project might affect any listed or proposed threatened or endangered species or its critical habitat, the project will be modified or abandoned to avoid conflict.

A cultural resource inventory will be required before any ground disturbance occurs. When a cultural resource that might be harmed is discovered, the project will be modified to avoid damage to the site.

Preventive Measures

Under Alternatives 1 and 2, prevention will become a critical element in control and prevention of new infestations.

Measures which will be pursued are:

1. Areas of soil disturbance, especially in high risk types, will be seeded immediately to vigorous cover species of grass and legumes. This will include road construction, road maintenance and areas where wildfire has resulted in a slow recovery of existing vegetative cover.

   Phosphate fertilization of legumes in infested areas may be utilized to enhance ground cover in order to reduce the opportunities for weeds to catch hold.

2. Compartment planning and timber sale planning in high-risk habitat land types will require consideration for noxious weeds. Existing or potential weed problems will be addressed in Environmental Analysis issues and concerns, and in evaluation criteria for management alternatives. Efforts to prevent distribution will be considered prior to entry into unroaded areas or drainages. Travel plan decisions will include evaluation of road use restrictions as a means of preventing noxious weed introduction.

Prevention of the spread of noxious weeds will be considered as justification for restricted road use. Off road travel will be discouraged in high risk sites.

3. Fleet vehicles and equipment will be cleaned regularly and kept free of weed parts, especially mature seed heads. Tires and undercarriages will be inspected regularly. Sale clauses and specifications for other contract work in high-risk types will require cleaning and inspection of equipment and vehicles brought into the area.

   Focus will be placed on controlling weeds in parking areas, equipment yards, road turnouts and other areas where vehicles may routinely contact a seed source. Gravel pits will be inspected for weed contamination and either treated or quarantined.

4. Noxious weed prevention and control will be addressed in range allotment management plans and special use permits. Livestock will be managed to avoid infested areas, mainly through riding and salting. Grazing use will be monitored to avoid over utilization, and degradation of range condition. Control will be focused on livestock driveways, concentration areas (water developments, corrals, meadows) and waterways.

5. A policy requiring only weed free hay and pellets to be used in the backcountry will be pursued.

6. An education and awareness program will be initiated to alert recreationists coming into the area to take preventive measures to avoid transporting weed seeds.

7. A coordinated weed control program will be entered with the county weed board and private and state landowners, to achieve a successful weed control and prevention effort.

Chemical Methods

The herbicides 2,4-D, picloram, and dicamba are the only three proposed for use at this time. Other or new herbicides could be proposed for use in the future, following a hazard analysis similar to the one in Appendix C .

Dicamba, 2,4-D and picloram are selective herbicides that can injure or kill broadleaf herbaceous plants, without injury to grasses, when applied according to label instructions.

Herbicides are applied in several ways, depending upon the treatment area, target species, expected costs, equipment limitations and potential environmental impacts.

The rate of application to be applied will vary according to the species and herbicide. In each case, this will be the lowest rate recommended for control. Herbicide applications will be timed to coincide with that period in which the species to be treated is most susceptible. The size of the areas to be treated range from 0.25 acres to approximately 15 acres.

Hand application would involve backpack spraying, wick application, and cyclone broadcast spreading (granular formulations). Backpack sprayers are operated at low pressure and low volume and release herbicide through a single nozzle. Backpack spray treatments would not be attempted when wind velocity exceeds 8 m.p.h. or used within 50 feet of riparian areas. Granular applications would be applied by broadcast spreaders, about 3.5 feet above ground and no closer than 10 feet from the high water line of streams or lakes. Wick applicators wipe the herbicide directly onto individual plants. These can be used right up to the high water line. The vehicle-mounted handgun sprayer would be used along the Forest Development Road #228, or possibly on other road rights-of-way where it is not practical to use the small backpack sprayer.

Developed recreation sites and concentrated use areas treated with herbicides would have signs posted stating the chemical used, date of application, and a contact number for more information. Signs would remain in place for at least 2 weeks after spraying.

All projects will be supervised by certified personnel trained in application and handling of herbicides. Personnel supervising or using restricted use herbicides shall be certified and licensed according to the Department of Agriculture's applicator certification plan, which provides for either Federal or state certification by state agencies with approved plans. An annual action and safety plan will be prepared at the Ranger District level.

Records of herbicide use will be recorded daily in a herbicide use log, including: temperature, wind speed, and direction; herbicide and formulation uses; quantity of herbicide and dilutent applied; location and method of application; and persons applying herbicides.

Noxious weed infestations will be inventoried periodically, as needed, to monitor existing infestations and identify new infestations. Pre- and post-evaluation will be completed on all herbicide projects. Monitoring will be done on all projects regardless of who did the actual work.

Manual Methods

Hand pulling and hand tools (shovel, hoe, pulaski) would be employed under Alternatives 1 and 2. These methods are highly labor intensive, requiring periodic retreatment, ranging from every 3 weeks during the growing season to annually depending on target species. These methods are only marginally effective on very small infestations, and impractical on large ones. Deep and extensive root systems seldom allow the removal of significant portions of the roots, or the extirpation of 100% of the plants in an area. Prolific seed production and resprouting generally exceeds time or funding available to achieve any level of control.

Mechanical Methods

Mowing and tilling would be used under Alternatives 1 and 2. These treatments prevent plants treated in the bud stage or earlier from producing seed. Retreatment every 2 weeks or so can deplete the underground food supply of some perennials. These methods would have to be repeated for several years to achieve satisfactory control, and would be used only in areas where slope is less than 10 percent and there is very little brush.

Biological Methods

Biological control involves using natural insect and disease enemies that will attack individual noxious plant species to retard growth and prevent seed formation (Montana State University, 1983).

Two seedhead gall flies (Urophora affinis, and U. quadrifasciata) have been released on spotted knapweed within the EIS area. Two root-mining moths, (Agapeta zoegana and Pelochrista medullana) may be released in the EIS area when they become available (Lincoln Conservation District Newsletter, 1985).

Other releases which have been made previously are the Musk thistle seed-head weevil (Rhinocyclus conicus) and a defoliating beetle which attacks St. Johnswart.

A Canada thistle stem mining weevil (Eutorphynchus letura), a spotted knapweed seed-head moth (Metzneria paucipunctella), and a fungus (Sclerotinia) are in development stages.

Biological control is a very slow and gradual process. It is best used as part of an integrated management program. Alternatives 1 and 2 would provide for continued monitoring of these bio-agents, and new releases as needed.

TABLE 2-1 SUMMARY OF IMPACTS BY ALTERNATIVE

	Existing	Alternative 1	Alternative 2	Alternative 3
Soils	There is variation in soils across the EIS area due to parent material & topography, decomposed granite & glacial lake sediments are the 2 key materials susceptible to erosion & sediment	Short-term increase in erosion. Long term stabilization.	Somewhat higher amounts of short-term surface erosion due to increased acres disturbed. Long term stabilization.	No change from existing environment
Water Quality	Water quality varies across EIS area. Sediment is major pollutant.	Some detectable levels of herbicides may enter streams from drift. Short-term impact may result from spraying in ephemeral stream channels.	Slightly increased suspended sediments and dissolved solids from mechanical controls.	No change from existing environment
Vegetation	Noxious weeds are spreading on forest lands within the EIS area. Reduced productivity of range allotment & spread of weeds to adjacent agricultural lands.	Production of grass species could increase. Some injury or loss of non-target browse plants may occur from herbicide use. Non-target species will become reestablished after treatment.	Some degree of weed control would be achieved, but noxious weeds would continue to spread due to ineffective weed control efforts. Desirable vegetation would decline & native plants would succumb to invaders.	Spread of noxious weed, loss of desirable vegetation.
Animals Livestock Wildlife	Livestock grazing is an important use of forest lands in the EIS area. Wildlife diversity, abundance, & habitat values are high	Adverse impacts would would be slight, tempcrary & localized. Over both the short & long term, animal habitat would improve benefiting all species of wildlife & livestock	Where non-chemical measures fail to control woods, weeds would continue to crowd out & reduce available forage & habitat leading to reduced wildlife diversity & livestock reductions.	Noxious weeds would spread unchecked, destroying habitat & eliminating grazing from Forest lands.
Fish	Habitat in fair to good condition. Good diversity of species & stable populations.	Habitat conditions & population levels would remain unchanged	Same as Alternative 1	Same as Alternative 1
Cultural Resources	Sites protected under Federal law. Surveys required prior to ground disturbance	Low probability of site damage, with mitigating measures	Low probability of site damage with mitigating measures. More survey work required	No site damage

	Existing	Alternative 1	Alternative 2	Alternative 3
Recreation/ Visual	Outdoor recreation is a major use of forest land. Camping & picnicking occur at sites that have noxious weeds.	Low probability of scenic degradation. Recreation areas infested with weeds would benefit by control, through reduction of exposure to adverse effects of noxious weeds. Recreational use would increase	Spread of noxious weeds would reduce the visual quality of the recreation site, make them less appealing to recreationists & lead to reduced use. Increase in exposure to weeds.	Same as Alternative 2
Wilderness Study Areas/ Special Areas	ETS area contains 1 Wilderness Study area and 1 Research natural area	Noxious weeds in WSA & RNA may be controlled. Suppression of noxious weeds would prevent loss of native vegetation & preserve ecological diversity and characteristics	Impacts would be the same under Alternative 1 if non-chemical means & prevention measures prove successful.	Noxious weeds or exotics would be spread through the WSA & RNA, competing with native vegetation, & despoiling the natural atmosphere.
Economic Conditions	Loss of production occurring on weed infested land. Due to number of scattered infestations possibility exists for major outbreak. Opportunity exists for relatively inexpensive control if action is taken soon.	Beneficial economic impact to the area. Increased livestock production, reduced costs to adjacent landowners in weed control efforts, feed purchase, & increased property values.	Slight increase in livestock production where control was successful. Spread of noxious weeds throughout grazing allotments, would cause reduction in stocking levels, & spread to tree plantations & agricultural lands would result in higher control costs for the private landowner & higher production costs, & decrease in property values.	Economic losses, reduced livestock production, would continue. Spread to non-public lands would contribute to a decline in productivity & economic loss.
Social Environment		Demonstrate good faith effort on part of Forest Service to control weeds on its lands, same as private landholders are required. Good neighbor policy. Demonstrate concern for effects of Forest management practices on adjacent lands.	Reduced credibility of Forest Service in eyes of state & private landowners & agencies by neglecting to act responsibly in controlling weeds on Forest lands.	Same as Alternative 2
Human Health		No adverse impacts expected from use of herbicides when handled according to label specifications.	Increase in potential injury through use of mechanical control methods.	Greatest adverse effect from lack of control of weeds may cause poisoning, physical discomfort

CHAPTER 3 - DESCRIPTION OF THE AFFECTED ENVIRONMENT

This chapter profiles the environmental resources within the EIS area. The resources include the relevant physical, biological, social, and economic conditions of an alternative.

1. General Setting

The Rexford and Fortine Ranger Districts are located in the north central and northeast portion of the Kootenai National Forest bordered by the Yaak Ranger District to the west, Flathead National Forest to the east, and Canada to the north.

Lake Koocanusa bisects the Rexford District into eastern and western halves, with the Tobacco River, Big Creek, Pinkham Creek, Dodge Creek, and Young Creek the more important drainages flowing into the reservoir. The Tobacco River valley provides most of the livestock grazing within the Kootenai Forest, with timber harvesting and commercial Christmas tree harvesting also important resource uses.

The Tobacco and Stillwater Rivers are the principle drainages with Grave, Sunday, and Fortine Creeks the main tributaries. The Ten Lakes Scenic Area is located along the Canadian border. Commercial timber harvesting and Christmas tree harvesting are important activities.

Outdoor recreation is considered an important aspect of living in the area with hunting, fishing, hiking, and camping the more popular activities. The Forest supports huntable populations of elk, moose, white-tailed and mule deer, black bear, and mountain lion.

Towns which lie adjacent to the analysis area are Rexford, Eureka, Fortine, and Trego. The combined population is less than 5000.

2. Geology and Topography

The Purcell and Salish Mountains were overridden by the continental ice mass which covered much of the northeastern half of the Forest. The ice scoured and rounded these mountains and filled many of the valleys with glacial till. The Whitefish Range projected above the continental ice mass where it was subjected to alpine glaciation. Glacial Lake Kootenai occupied the major valleys of the Kootenai River drainage during the late stage of the glacial epoch, leaving behind thick deposits of glacial silt.

3. Soils

Soils within the study area, for the most part, have been influenced by glaciation and typically have a low inherent fertility. Sediment is the primary contaminant of water quality. Two of the major soil materials on the Forest that are particularly susceptible to erosion and sedimentation are the decomposed granitics and the glacial lakebed sediments.

4. Climate

The climate of the Kootenai has been described as "modified Pacific maritime" in character, meaning that compared to the remainder of Montana, this area's climate resembles that found along the Pacific Coast. The character is modified by occasional intrusions of arctic air masses, more commonly found in the remainder of the state. Average temperatures reflect the moderating influence of Pacific air masses. Average annual temperature is around 45 degrees in the Eureka area. The "wet season" usually occurs in fall and early winter. Average precipitation in the area is around 14 inches in the valleys and increases to around 60 inches at high elevations in the mountains.

5. Vegetation

Most of the EIS area is tree covered. The habitat types within the area identified as being high risk for weed invasion are those within the drier Douglas-fir series including Douglas-fir/bluebunch wheatgrass, Idaho fescue, rough fescue, pine grass, and snowberry habitat types. These encompass approximately 45,138 acres.

Wetlands occur along the numerous lakes, ponds, marshes, and streams. They are often inundated by water and normally have saturated or seasonally saturated soil conditions. Due to the abundance of moisture and nutrients, wetlands are often the most productive areas for vegetation growth. They are valuable for wildlife habitat and provide a large portion of the forage in the grazing allotments. These sites are vulnerable to numerous species of noxious weeds such as Canada thistle and spotted knapweed.

6. Water

Surface water is an important resource throughout the EIS area. Large amounts are used by agriculture for irrigation and watering livestock, and for industrial use. Sinclair and Deep Creek drainages are classified as municipal watersheds, although they are not currently used for that purpose.

Non-consumptive uses includes recreation, aesthetics, and hydropower generation. Groundwater is the main source of water for municipal and domestic usage. Sediment caused by road and timber activity is the major contaminant to water quality.

7. Wildlife and Fish

The EIS area supports huntable populations of elk, moose, white-tailed and mule deer, black bear and mountain lion. Bighorn sheep range occurs on the slopes just east of Lake Koocanusa. Blue, Franklin, and ruffed grouse occupy timbered areas with associated aspen, conifer, and streamside vegetation. Nongame species are numerous. They include a variety of songbirds and small mammals such as weasels, minks, beavers, flying squirrels, and porcupines.

Most of the waterfowl are migrant, short term occupants, following the Pacific flyway during spring and fall, but the wetlands also support nesting ducks and Canada geese.

The rivers, streams, and lakes support populations of rainbow, westslope cutthroat, bull, and brook trout, and mountain whitefish. A ling fishery exists along portions of the Tobacco River. Lake Koocanusa has a growing kokanee fishery, that has recently attracted thousands of anglers. Some of the lakes also support populations of yellow perch, largemouth and smallmouth bass, sunfish, and kokanee.

8. Threatened and Endangered Plants and Animals

At the present the EIS area has habitat identified for three endangered and one threatened species. These are the bald eagle, peregrine falcon, gray wolf, and the grizzly bear, respectively. Grizzlies are yearlong residents, eagles are predominately winter residents, peregrine falcons are occasional migrants, and wolves are primarily transients from Canada and the Northfork of the Flathead. Reports of caribou have been made in the Ten Lakes area, but no resident populations have been identified. (Appendix E)

There have been no threatened or endangered plants identified within the EIS area. One sensitive species, yellow lady slipper (Cypripedium parvoflorum), has been identified on one site on the Fortine District. (Appendix F)

9. Livestock

Currently 2429 cattle are permitted to graze the EIS area for a period of four months from June through September.

10. Social/Economic

The population of Lincoln County is around 18,000 based on 1982 data. Local economic dependency is resource based and strongly influenced by National Forest landownership patterns and policies. Farm income derived from some 162 farm operations was around $718,000.

The majority of this activity is in the Tobacco Valley area. Total acreage in agricultural status in the county is around 51,000 acres. Some 17,000 acres of pastureland in the county is susceptable to spotted knapweed invasion (Lincoln County Profiles,1983).

Most of the people live in the area because of the natural environment. Because of the proximity of the Forest and the local dependency, much interest is expressed by the public in Forest activities and management plans.

Currently 37 permittees depend in part on Forest Service grazing within the EIS area. The uncontrolled spread of noxious weeds will severely affect the viability of their operations.

The scoping phase of the environmental analysis process revealed two major social issues regarding the noxious weed problem.

a. The concern over the threat to agricultural production from the introduction and spread of noxious weeds on the Forest is a major issue. The local agricultural community, County Extension Office and

County Weed Board have expressed this concern. The County Weed Board has cited difficulty in persuading private landowners to control weeds when the Forest Service is neglecting to take adequate measures on its surrounding or adjacent lands.

b. Public health and safety relative to the use of pesticides for the control of noxious weeds is another issue. The concern in the area appears to be associated with the method of application and the care and safety used by those applying the herbicide, as well as to herbicide use in general. At the present, the county has curtailed its weed spraying operation due to the skyrocketing cost of liability insurance.

11. Cultural Resources

The Forest Service has been charged with responsibility for managing cultural and paleontological resources on lands under its jurisdictions. Through a group of laws beginning with the Antiquities Act (1906), the Forest Service has been mandated to identify, protect, and enhance such resources.

Numerous archaeological, historical, and paleontological sites have been found on or near Forest Service administered lands. Future surveys are certain to locate new sites. Most identified archeological sites appear to have been small, seasonally used campsites. Most historical sites relate to early settlement, transportation and logging.

12. Recreation

Outdoor recreation is considered an important aspect of living in the area. Among the outdoor recreation activities occurring on Forest Service lands within the EIS area are sightseeing, picnicking, berry picking, hunting, fishing, and camping. Recreational use will continue to grow as more people from outside the area become familiar with the opportunities available. Significant increases in use levels are occurring along Lake Koocanusa, due to the developing kokanee fishery. Opportunity for introduction and spread of noxious weeds at developed and dispersed sites will increase with increased use levels.

Wilderness and Special Areas

13. The 34,200 acre Ten Lakes Montana Wilderness Study Act area is located in the Whitefish Range on the Fortine Ranger District. Wilderness attributes include high scenic value, quality roadless hiking and horseback riding, and excellent opportunities for solitude. Use is expected to increase if the area receives designation as a wilderness area.

The Big Creek resource natural area (RNA) is located west of Lake Koocanusa on the Rexford District. The area represents a unique, near pristine, Douglas Fir/Dwarf huckleberry habitat type valuable as a study area.

CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

Chapter 4 describes environmental consequences of three alternatives to the existing environment as described in Chapter 3 and analyzes the significant impacts resulting from implementing each alternative.

Analysis, including the scoping process, reveals that the proposed program for controlling noxious weeds would not significantly affect climate, geology, topography, air quality, minerals, paleontological resources, energy requirements, or visual resources; therefore, they are not discussed further.

IMPACTS ON SOILS

Soils could be adversely affected by mechanical or chemical treatment. Under Alternative 1, removal of solid stands of noxious weeds by chemical treatment may result in short term insignificant increases in surface erosion that would be mitigated as vegetation re-occupies the treated site.

The behavior of the three proposed herbicides in the soil are as follows:

a. 2,4-D - Has a very low persistence (one month or less) in most soils. It is relatively mobile in the soil. The primary mechanism for degradation of 2,4-D is microbiological activity. This occurs quickly in soils with high organic matter, and under warm, moist conditions (Agricultural Handbook No. 633).

b. Dicamba - Is moderately persistent (3 to 12 months), does not adsorb readily to soil particles, and is highly mobile. The primary mechanism for breakdown is microbial decomposition.

c. Picloram - The persistence is moderate to high depending on treatment rate and climate. It may remain at phytotoxic levels for one year or more after normal application. The fate of picloram in soil is determined by volatilization, photodecomposition, adsorption and leaching, runoff and chemical and microbial degradation. Picloram is considered to be a mobile herbicide. At low application rates it is usually confined to the upper one foot of soil. Persistence is shortest in soils with high organic matter and under warm, moist conditions.

Use of the three chemical herbicides as proposed under Alternative 1 would not degrade soil productivity.

Under Alternatives 1 and 2, mechanical weed control practices such as tilling could result in slight short-term increases in erosion. The erosion rates would quickly decline as desirable vegetation re-occupies the treated area.

TABLE 4-1

BEHAVIOR OF HERBICIDES IN SOIL

ACTIVE INGREDIENT (COMMERCIAL NAME)	BEHAVIOR IN SOIL
2,4-D	Degradability in soil depends on microbial activity, but is fast in organic and moist soils. Persistence is short, and mobility is relatively high.
Dicamba (Banvel)	Moderately persistent, does not adsorb readily to soil particles, and is highly mobile. Mainly lost from soil by microbial decomposition.
Picloram (Tordon)	Highly stable in plants, can be leached, relatively nonvolatile. Moderately to highly persistent in soil. Relatively mobile.

IMPACTS ON WATER

Alternative 1 (Proposed Action) would have a very small impact on water resources. There is a possibility of traces of herbicides entering water systems as a result of either drift or surface runoff. An increase in suspended sediments or dissolved solids could result from soil disturbance associated with mechanical treatments, under Alternatives 1 and 2.

Through use of buffer strips, with applicators and handsprayers, little drift will occur. The low application rates and small acreages to be treated will minimize the movement of residual spray by surface runoff. Hand grubbing would not be applied to steep slopes, and buffer strips would be left next to surface water to minimize siltation.

Ground water would not be affected under any alternative.

IMPACTS ON VEGETATION

The herbicides, picloram, dicamba and 2,4-D, are selective in their action. Most broadleaf herbacious plants, woody shrubs, vines and trees are susceptible to toxic response to these chemicals. However, most grasses are resistant and show little effect (Dow Chemical, 1983). As a result of this selective action, herbicide treatment tends to release grasses from competition with herbaceous plants and results in increased grass production.

Some non-target plants would be injured or killed where there is an intermingling of noxious weeds. This would only be a short term effect. Desirable vegetation would re-occupy the sites formerly taken over by the noxious weed.

Mechanical treatment, such as tilling or hand grubbing would injure both the tops and portions of the underground plant parts of all vegetation within the treatment site. Grubbing and tilling may create a better seedbed for weeds, promoting further spread.

Under Alternative 3, No Action, weeds such as spotted knapweed and leafy spurge, which emit allelopathic toxins, could inhibit other vegetation and result in the development and perpetuation of a noxious weed monoculture. This could have drastic effects on sensitive plant species, by eliminating them from their habitat. Noxious weeds would continue to outcompete desirable plant species, resulting in reduced grass and forb production.

THREATENED AND ENDANGERED PLANTS

There are no known Federally listed threatened and endangered plants on the Rexford and Fortine Districts of the Kootenai National Forest. Unidentified populations of threatened and endangered plants could be susceptible to any impacts described for terrestial vegetation. Direct effects of injury or death to plants could immediately eliminate a species in a portion of its range. The more subtle effects of vegetation community changes could eventually eliminate a species on a specific site locally through the loss of the ability to compete with other vegetation.

If the U. S. Fish and Wildlife Service determines that any vascular plant species is threatened or endangered, any action that would contribute to its extinction or to its threatened or endangered status would violate the Endangered Species Act of 1973, as amended. Therefore, a review will be made before any site-specific action to document any threatened or endangered plants known on the site and will identify measures to protect these species. If any are found, the proposed action will be modified, or abandoned as necessary to meet the requirements of the Threatened and Endangered Species Act.

A list of sensitive or unique plants located on the Kootenai National Forest is included in Appendix G . All alternatives would be responsive to areas containing unique plants and all activities will be managed to retain the habitat for these species.

IMPACTS ON ANIMALS

Impacts to livestock can occur directly from ingestion of poisonous noxious weeds, or those that cause mechanical injury, such as ingestion or inhalation of spines.

There are currently no known losses occurring from poisonous weeds within the study area.

Under Alternative 1, chemical treatments will be applied in a manner or at such low rates that they will not affect livestock. 2,4-D, Dicamba, and Picloram do not bioaccumulate to any extent in the animal tissue, and are eliminated rapidly, after ingestion (USDA 1984).

Alternative 3, and to a lesser extent, Alternative 2, would result in a decline in desirable forage, forcing livestock to utilize less desirable plants, and eventually require a reduction in livestock numbers.

WILDLIFE

The possibility of adverse effects on fish or wildlife from herbicide contamination is extremely slight to non-existent, as proposed under Alternative 1. The toxicity of Picloram, 2,4-D, and Dicamba on wildlife is extremely low and does not bioaccumulate in either fish or wildlife (Pesticide Background Statement, 1984). The toxicity of the three chemicals on fish varies by species, but is well in excess of the amounts that will be applied.

Impacts on wildlife may result from temporary and insignificant loss of habitat where herbaceous plants or shrubs are injured or killed due to being intermingled with noxious weeds that were treated.

Mechanical methods may displace wildlife during the treatment period.

Biological control would have no effects to either fish or wildlife.

Under Alternative 3, continued loss in forage production in weed infested areas would harm wildlife. The immediate impact would be displacement, which would place greater stress on other foraging areas and force more competition between livestock and big game. In the long term, game populations may decline. The loss of plant diversity could lead to reduced vigor in the animals occupying the area, making them more susceptible to other stress factors.

IMPACTS ON THREATENED AND ENDANGERED ANIMALS

Threatened and endangered species receive special attention under the Endangered Species Act of 1973, as amended, and Forest Service policies and guidelines. Noxious weed control activities will avoid known nest and roost sites and critical habitat of listed species or will take special precautions to insure the well-being of these species. No adverse impacts are expected to occur due to special precautions in known habitats, low potential effects of chemicals to be used, and small acreages scheduled for treatment. Formal consultation with the U.S. Fish and Wildlife Service is not recommended.

IMPACTS ON CULTURAL RESOURCES

Hand grubbing or mechanical control measures could potentially disturb or destroy unidentified cultural resources on or near the ground surface. The potential for damage would vary with the amount of ground disturbance. Tilling weeds could damage artifacts and disrupt relative positions of cultural materials. Mixing organic matter in archeological sites could contaminate carbon 14 dating samples making them unreliable for scientific analysis. Uncovering sites could increase the possibility of illegal artifact collecting.

Cultural resource surveys would precede management actions that could damage cultural resources. Sites discovered during these surveys will be protected in accordance with appropriate Federal regulations (36 CFR 800).

IMPACTS ON RECREATION

Treatments such as tilling, grubbing and applying herbicides cause visual impacts mainly by creating color contrasts between treated areas and surrounding vegetation. Tilling, as proposed under Alternatives 1 and 2, disrupts the land surface and exposes bare soils to view. Under Alternative 1, herbicides, may temporarily reduce vegetation diversity and can prevent the occurrence of seasonal changes such as emergence of spring flowers or fall colors. The short term impacts, however, would end with the reestablishment of other plants on the site.

Impacts of herbicide residue on the health of public land visitors are discussed in the Human Health Risk Analysis. (Appendix C.)

Under Alternative 3, No weed Control, the recreation experience level in recreation sites would be decreased with the weed infestations as the adverse exposure to weeds increased, creating undesirable situations for adults, children and animals.

IMPACTS ON WILDERNESS AND SPECIAL AREAS

The threat of spreading exotic noxious weeds through the Ten Lakes Wilderness Study Area is serious. Spotted Knapweed has already infested some sites along Grave Creek, the main access to the proposed wilderness area. Wilderness character can be affected by the spread of noxious weeds and could pass unnoticed until a significant infestation occurred. The successful competition of these plants would eventually decrease the diversity and vigor of the naturally occurring vegetation.

As more visitors and recreation livestock travel through the area, the chances of spread increase. Forest Service policy (FSM 2323.246) allows chemical or hand-grubbing control for noxious weeds. Such a program would require Regional Forester approval (2323.046). Under Alternatives 1 and 2, preventive measures would be the only means of control proposed.

IMPACTS ON ECONOMIC AND SOCIAL CONDITIONS

The economic and social effects of spreading noxious weeds is often difficult to assess as the costs are often hidden and the effects tend to be cumulative.

The current loss of AUM's on the Rexford and Eureka Districts is not significant. The potential loss would be devastating to the 35 permittees who depend on Forest lands for all or part of their summer forage needs. Currently, 14,419 AUM's are taken off the Forest within the two districts. Studies completed in Oregon and British Columbia showed a 63% reduction in capacity from spotted knapweed infestation (French and Lacey, 1983). That would equate to a loss of 9,083 AUM's if knapweed was not controlled. Cost to the federal government in reduced revenues would amount to $12,262 per year (based on 1986 grazing fee of $1.35/AUM).

With the loss of forest grazing, the numbers of livestock raised by the permittees would decline accordingly and some may be forced out of business. Those remaining would be required to seek out scarce and expensive summer range and to produce or purchase additional forage.

Another potential economic impact is the spread of noxious weeds from the forest lands to adjacent private and state lands. The cost and potential effect of this spread is not known, but would reflect a loss in productivity of non-irrigated agricultural lands, plus the increased cost of control which would be borne by the private landowner.

Most of the agricultural production in Lincoln County occurs in the Tobacco Valley area adjacent to and surrounded by National Forest land. The agricultural economy of the area is important to the community of Eureka. The cultivation of Christmas trees has become a major industry in the area. The infestation of these plantations by noxious weeds could result in a significant loss in seedling survival, creating severe adverse economic impacts to this industry. Under current economic conditions of decreasing land values and decreasing livestock market values, rural areas such as the Tobacco Valley, are economically threatened. This becomes even more critical, when the other major industry, forest products, is also in a depressed state. The economic and social stability of the region could become severely strained, as businesses and residents leave the area seeking a more favorable economic climate.

IMPACTS ON HUMAN HEALTH

Mechanical and Manual Treatments

Risks involved with mechanical and manual treatments affect only the workers. Operators of machinery (riding or tractor mounted mowers) could be injured by losing control of equipment on steep terrain or by coming into contact with flying debris and brush. Such hazards could be reduced by using experienced operators, restricting equipment to use on ground with less than 10% grade, and through use of proper safety guards on equipment. Such hazards would be most likely under Alternative 2.

Under Alternatives 1 and 2, some hand pulling and tilling with hand tools would be done. Hand pulling exposes workers to the hazards of physical contact with irritant weeds that can cause blisters, inflammation, or dermatitis. Sensitive individuals can react severely to the pollen of some plant species, and the close contact of hand pulling could cause major discomfort or health risks. Use of hand tools, such as a hoe or pulaski, pose inherent risks from cuts or back strain. This would be mitigated by requiring workers to wear gloves, use appropriate tools, take frequent rest breaks, and by not using workers with known allergies.

Chemical Treatments

Herbicides are intended to be toxic to plants. They are designed to interfere with vital plant processes that do not occur in animals: seed germination, hormone (auxin)- mediated growth and development, and photosynthesis. Basic biological and physiological differences between plants and animals partly account for the relatively low toxicity of herbicides to animals.

An extensive analysis of herbicides proposed for use in Region 1 has been documented in "Analysis of Human Health Risks of USDA Forest Service Use of Herbicides to Control Noxious Weeds in the Northern Region". This document provides the basis to analyze the human risk associated with the noxious weed program on lands administered by the Kootenai National Forest.

The human health risk analysis (Appendix C) assesses exposures at levels which are higher than would be anticipated under the proposed application rates. In addition, mixing errors and a variety of incidents are considered which would be unlikely, yet possibly could occur in a spray situation.

The risk analysis looks at four areas proposed for treatment. These examples are defined on the basis of proximity to water and human residents, size of spray area, and amount of herbicide used. Even when considering worst case situations, the no observable effect levels (NOEL) are not exceeded. The worker dose levels do not exceed NOEL's but acceptable daily intake (ADI) is exceeded in all situations.

The Risk Analysis considers the worst case and emphasizes the importance of a well controlled program which provides maximum protection to minimize exposure.

See Appendix C for the complete health risk analysis for the Kootenai National Forest.

The herbicides considered for use on the Kootenai National Forest are 2,4-D, picloram, and dicamba. Alternative 1, may use all of these chemicals. The proposed application rates can be found in Appendix B, and do not exceed tolerable limits of human health risk (See Table 4-2).

The main impacts on human health from herbicide treatments depend upon the toxicity of the chemical and the level of human exposure. All chemical effects on biological systems follow a dose-response relationship, as dose increases so does effect. The chemicals proposed for use on the Kootenai National Forest have not been found to cause significant mutagenic or carcinogenic effects. For such chemicals, a (NOEL) dose can be established as the highest dose that does not produce a particular toxic effect in a test population. The term threshold is also used to identify this dose range. The NOEL or threshold values vary for different toxic effects. These NOEL's have been determined for application rates of 1.0 pound AI/A for 2,4-D and 2.0 pounds AI/A for picloram.

It is important to note that these levels either equal or are in excess of proposed application rates for the Kootenai National Forest. NOEL is the highest daily dose that causes no effect in the animal test population.

TABLE 4-2
TOXICITY OF PROPOSED HERBICIDES

Herbicide	Toxicity	Teratogency	Carcinogenicity	Chronic Toxicity NOEL in mg/kg/day
2,4-D	mildly toxic	potentially	potentially	1.00
Dicamba	slightly toxic	potentially	no evidence	1.25
Picloram	slightly toxic	none observed	potentially	7.00

Dicamba is generally non-toxic to a wide variety of non-target organisms. Studies with invertebrates and microorganisms show, in general, median lethal concentrations in excess of 100 ppm. It is only slightly toxic to fish and amphibians with LC50's in excess of 10 ppm. Acute oral toxicities to birds were equal to or greater than 673 mg/kg body weight.

In experimental studies with mammals, dicamba was a mild skin irritant and moderate skin sensitizer. Direct application of dicamba caused transient low grade eye irritation. The inhalation toxicity of dicamba was very low. Acute and subchronic ingestion of dicamba in laboratory animals resulted in slight toxicity. In isolated case reports, oral ingestion of dicamba by sheep caused death. Chronic consumption of dicamba in the diets of rats and dogs for two years elicited no adverse health effects, but chronic consumption by mice caused decreased body weight and increased liver weight. In rats, dicamba caused no reproductive or teratogenic effects. In rabbits, dicamba caused post-implantation losses, a decreased number of live fetuses, and decreased fetal weights. Dicamba is not considered to be mutagenic.

Picloram and its salts are low in toxicity to most nontarget organisms. Picloram is relatively non-toxic to soil microorganisms at concentrations up to 1,000 ppm. For most species of fish, picloram formulations, are only slightly toxic with median lethal concentrations of greater than 10 ppm. The acute toxicity for birds is greater than 2,000 mg/kg. In subchronic feeding studies, with birds, LD50 (the lethal dosage at which fifty percent of test animals will be killed) is greater than 5000 ppm.

In studies with experimental and farm animals, the acute toxicity ranged from 8,200 mg/kg in rats to greater than 950 mg/kg in cattle. Tests with rabbits indicate that picloram is not likely to be absorbed through the skin. The LD50 in dermal toxicity tests with rabbits is greater than 4,000 mg/kg. Although it is a mild skin irritant in rabbits, patch tests show that it does not sensitize the skin of humans. Rats, exposed to a saturated atmosphere of picloram formulation for 7 hours, showed no significant adverse effects indicating that inhalation of picloram is not likely to cause illness. Since picloram induces only moderate eye irritation in rabbits, which heals readily, it is not likely to cause injury to the cornea or blindness. Long-term studies in rats and dogs showed no observable adverse effects when doses of up to 150 mg picloram/kg body weight were fed for 2 years. Studies in rats and mice showed that picloram is nonteratogenic even at doses toxic to the pregnant animals, and has little or no effect on fertility, reproduction, or development of offspring. Picloram was generally found to be nonmutagenic and noncytogenetic. It appears to present little or no carcinogenic risk, although bioassays on mice and rats suggested the ability to induce benign liver tumors in rats.

2,4-D is considered to be a relatively non-persistent herbicide, which generally remains within the top foot of the soil profile. It has weak mutagenic activity in some of the many assays to which it has been subjected. It can cause fetal toxicity when the dose is raised high enough. It is a teratogen in some animal species but not in others. The toxicological properties of 2,4-D indicate that most formulations of 2,4-D are mildly toxic to animals and birds. Most ester formulations are toxic to highly toxic to aquatic invertebrates and fish.

Based on acute and chronic toxicity studies, 2,4-D is mildly toxic causing gastronintestinal disturbances, weight loss, muscle weakness, and loss of coordination. Some formulas cause mild eye, skin, and respiratory irritation. There is no conclusive data that 2,4-D is a carcinogen (Appendix D). The reported exposure levels at which toxic effects have been observed in experimental animals are considerably higher than levels anticipated for USDA Forest Service applications. Chemical exposure may be brief (acute) or

prolonged (chronic). The kind of response observed in organisms depends on the route of intake (oral, dermal, inhalation) and frequency of exposure, coupled with the specific mechanisms of toxicity. A chemical of high toxicity may represent no or limited hazard if exposure and dose are low, just as a chemical of limited toxicity may be hazardous if exposure is high. Extensive studies of the absorption, distribution, metabolism, and excretion of herbicides in animals (DOE, BPA 1983) have shown that the herbicides and their metabolites are rapidly eliminated from most animals and do not substantially accumulate in animal tissues. These traits further reduce the possibility that exposure will result in harmful consequences.

Of concern is the probability that use of a chemical will result in an irreversible disease such as reproductive or genetic effects. Reproductive effects include fertility, miscarriage, general fetal toxicity, and birth defects (teratogenesis). Genetic effects are those that alter cellular DNA and could result in cancer or mutations. Almost all chemicals will produce reproductive effects in the laboratory at some dose, although some cause maternal death before any detectable impact occurs to the fetus. Of the great number of chemicals in commerce that have been tested, few have been shown to cause cancer, and few have shown significant mutagenic activity in the variety of tests used to screen for genetic activity.

All workers must be advised explicitly of the hazards of these chemicals and instructed in the careful herbicide application techniques so as to reduce dose levels below worst-case values assumed here. Proper supervision of workers cannot be overemphasized. Any precautions taken, i.e. proper protective clothing, respirators, goggles and good sanitary practices, will reduce the risk level. Restrictions on the use of women of child bearing age as applicators are advisable, because of the low teratogenicity margins of some chemicals.

Finally, as a margin of safety, no individual workers should be allowed to apply herbicides for more than 10 days on the Forest.

The above discussion on herbicide treatments was extracted from the following sources: Pesticide Background Statements, USDA Forest Service, Volume 1, Herbicides, Agricultural Handbook No. 633, August 1984; Final Environmental Impact Statement, Northwest Area Noxious Weed Control Program, U.S. Department of the Interior, Bureau of Land Management, Portland Oregon, December 1985; U.S. Department of Agriculture, Forest Service, Region 1, Human Risk Analysis.

SYNERGISTIC EFFECTS

Synergistic effects of herbicides are those that occur because of simultaneous exposure to more than one herbicide. The worst case analysis (Appendix C) deals with a 2,4-D/dicamba mixture. Under the proposed use, only one herbicide will actually be applied per project. Therefore, synergism will not be a concern in this program.

CHAPTER 5 - LIST OF PREPARERS

EIS TEAM MEMBERS

Mike O'Farrell
EIS Team Leader Range Conservationist - B.A. History, University of Montana, 1973, B.S. Range Science, Montana State University, 1977; 8 years Forest Service Experience; primary responsibilities in range, wildlife and watershed.

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B.S. in Wildlife Conservation and Management, Southwest Missouri State University; M.S. in Wildlife Biology, Colorado State University; 2 years experience in soil science, 11 years in wildlife with U.S. Forest Service; primary responsibilities - Resource Assistant in charge of range, wildlife, soil & water, minerals, recreation, and special uses.

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Guenther Heinz
B.S. in Forestry, University of Idaho, 1972; majored in Wildlife and Fishery resources; 8 years experience in silviculture, sale preparation, sale administration; 6 years experience in wildlife; primary responsibilities in wildlife, range and watershed.

RESOURCE SUPPORT

Eric Heyn

B.S. in Forestry, University of Missouri; M.S. in Outdoor Recreation/Watershed; 12 years experience with Forest Service; primary responsibility - Resource Forester responsible for recreation, special uses, minerals.

Jannie Pray Tincher
3 years Health Sciences, San Jose State University; 1 year Biological Sciences, University of Montana, 9 years experience in resources, budget & finances, personnel, word processing; primary responsibility - Forestry Technician in recreation, range, and watershed.

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Weed Extension Specialist Montana State University

CHAPTER 6

LIST OF AGENCIES, ORGANIZATIONS, AND ELECTED OFFICIALS TO WHOM DRAFT COPIES OF EIS WERE SENT

Max Baucus, U.S. Senator
John Melcher, U.S. Senator
Pat Williams, U.S. Congressman
Mary Lou Peterson, State Congresswoman
Lincoln County Commissioners
Agriculture Research Service
Animal and Plant Health Inspection Service
ASCS Office
Bureau of Indian Affairs
Bureau of Land Management
Bureau of Reclamation
Cooperative Extension Service
Environmental Protection Agency
Farmers Home Administration
Fish Control Laboratory
Fish and Wildlife Service
Forest Service
    Northern Regional Office
    Rocky Mountain Research Station
    Rocky Mountain Range & Forest Experiment Station
    Idaho Panhandle National Forest
    Lolo National Forest
    Flathead National Forest
National Park Service
    Theodore Roosevelt National Park
    Yellowstone National Park
Northern Great Plains Research Center
Soil Conservation Service
Department of the Air Force
Department of Community Affairs
Department of Fish, Wildlife and Parks
Department of Health
Department of Natural Resources & Conservation
Department of State Highways
Department of State Lands
Governor's Office
State Clearinghouse
State Historic Preservation Officer
State Library
Montana Wilderness Association

APPENDIX A

FEDERAL NOXIOUS WEED CONTROL LAWS

Carlson-Foley Act (PL 90-583)

Federal Noxious Weed Act (PL 93-629)

Public Law 90-583

October 17, 1968
[S. 2671]

AN ACT

To provide for the control of noxious plants on land under the control or jurisdiction of the Federal Government.

Noxious plant control.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the heads of Federal departments or agencies are authorized and directed to permit the commissioner of agriculture or other proper agency head of any State in which there is in effect a program for the control of noxious plants to enter upon any lands under their control or jurisdiction and destroy noxious plants growing on such land if—

(1) such entry is in accordance with a program submitted to and approved by such department or agency: *Provided*, That no entry shall occur when the head of such Federal department or agency, or his designee, shall have certified that entry is inconsistent with national security;

(2) the means by which noxious plants are destroyed are acceptable to the head of such department or agency; and

(3) the same procedure required by the State program with respect to privately owned land has been followed.

SEC. 2. Any State incurring expenses pursuant to section 1 of this Act upon presentation of an itemized account of such expenses shall be reimbursed by the head of the department or agency having control or jurisdiction of the land with respect to which such expenses were incurred: *Provided*, That such reimbursement shall be only to the extent that funds appropriated specifically to carry out the purposes of this Act are available therefor during the fiscal year in which the expenses are incurred.

Appropriation authorization.

SEC. 3. There are hereby authorized to be appropriated to departments or agencies of the Federal Government such sums as the Congress may determine to be necessary to carry out the purposes of this Act.

Approved October 17, 1968.

January 3, 1975
[H. R. 11273]

AN ACT

To provide for the control and eradication of noxious weeds, and the regulation of the movement in interstate or foreign commerce of noxious weeds and potential carriers thereof, and for other purposes.

Federal Noxious Weed Act of 1974.
7 USC 2801 note.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Federal Noxious Weed Act of 1974".

7 USC 2801.

SEC. 2. The importation or distribution in interstate commerce of noxious weeds, except under controlled conditions, allows the growth and spread of such weeds which interfere with the growth of useful plants, clog waterways and interfere with navigation, cause disease, or have other adverse effects upon man or his environment and therefore is detrimental to the agriculture and commerce of the United States and to the public health. The uncontrolled distribution within the United States of noxious weeds after their importation or interstate distribution has like detrimental effects and allowing such distribution encourages and facilitates the burdening and obstructing of interstate and foreign commerce, and is inimical to the public interest. Accordingly, the Congress hereby determines that the regulation of transactions in, and movement of, noxious weeds as provided in this Act is necessary to prevent and eliminate burdens upon and obstructions to interstate and foreign commerce and to protect the public welfare.

Definitions.
7 USC 2802.

SEC. 3. As used in this Act, except where the context otherwise requires:

(a) "Secretary" means the Secretary of Agriculture of the United States or any other person to whom authority may be delegated to act in his stead.

(b) "Authorized inspector" means any employee of the Department of Agriculture, or any employee of any other agency of the Federal Government or of any State or other governmental agency which is cooperating with the Department in administration of any provisions of this Act, who is authorized by the Secretary to perform assigned duties under this Act.

(c) "Noxious weed" means any living stage (including but not limited to, seeds and reproductive parts) of any parasitic or other plant of a kind, or subdivision of a kind, which is of foreign origin, is new to or not widely prevalent in the United States, and can directly or indirectly injure crops, other useful plants, livestock, or poultry or other interests of agriculture, including irrigation, or navigation or the fish or wildlife resources of the United States or the public health.

(d) "United States" means any of the States, territories, or districts of the United States.

(e) "Interstate" means from any State, territory, or district of the United States into or through any other State, territory, or district.

(f) "District" means the District of Columbia, the Commonwealth of Puerto Rico, or any possession of the United States.

(g) "Move" means deposit for transmission in the mails, ship, offer

for shipment, offer for entry, import, receive for transportation, carry, or otherwise transport or move, or allow to be moved, by mail or otherwise.

Prohibitions. 7 USC 2803.

SEC. 4. (a) No person shall knowingly move any noxious weed, identified in a regulation promulgated by the Secretary, into or through the United States or interstate, unless such movement is authorized under general or specific permit from the Secretary and is made in accordance with such conditions as the Secretary may prescribe in the permit and in such regulations as he may promulgate under this Act to prevent the dissemination into the United States, or interstate, of such noxious weeds.

(b) The Secretary may refuse to issue a permit for the movement of any such noxious weed when, in his opinion, such movement would involve a danger of dissemination of such noxious weeds into the United States or interstate.

(c) No person shall knowingly sell, purchase, barter, exchange, give, or receive any such noxious weed which has been moved in violation of subsection (a), or knowingly deliver or receive for transportation or transport, in interstate or foreign commerce, any advertisement to sell, puchase, barter, exchange, give, or receive any such noxious weed which is prohibited from movement in such commerce under this Act.

Quarantines and regulations. 7 USC 2804.

SEC. 5. (a) The Secretary may promulgate such quarantines and other regulations requiring inspection of products and articles of any character whatsoever and means of conveyance, specified in the regulations, as a condition of their movement into or through the United States and otherwise restricting or prohibiting such movement, as he deems necessary to prevent the dissemination into the United States of any noxious weeds, and it shall be unlawful for any person to move any products, articles, or means of conveyance into or through the United States contrary to any such regulation.

Temporary quarantine.

(b) Whenever the Secretary has reason to believe that an infestation of noxious weeds exists in any State, territory, or district, he may by regulation temporarily quarantine such jurisdiction, or a portion thereof, and by regulation may restrict or prohibit the interstate movement from the quarantined area of any products and articles of any character whatsoever and means of conveyance, capable of carrying such noxious weeds, and after promulgation of such quarantine and other regulations, it shall be unlawful for any person to move interstate from a quarantined area any such products, articles, or means of conveyance, specified in the regulations, except in accordance with such regulations: *Provided, however*, That such quarantine and regulations shall expire at the close of the ninetieth day after their promulgation.

Expiration.

Hearing.

(c) However, if, after public hearing, the Secretary determines, on the basis of the information received at the hearing and other information available to him, that such a quarantine and regulations are necessary in order to prevent the interstate spread of noxious weeds from any State, territory, or district in which he determines an infestation of noxious weeds exists, and to protect the agriculture, commerce, fish, or wildlife resources of the United States or the public health, he shall promulgate such quarantine and other regulations as he determines are appropriate for such purposes, and thereafter it shall be unlawful for any person to move interstate from any quarantined area any regulated products, articles, or means of conveyance except in accordance with such regulations.

Disposal. 7 USC 2805.

SEC. 6. (a) Except as provided in paragraph (c) of this section, the Secretary may, whenever he deems it necessary as an emergency measure in order to prevent the dissemination of any noxious weed, seize, quarantine, treat, destroy, or otherwise dispose of, in such manner as he deems appropriate, any product or article of any char-

acter whatsoever, or means of conveyance, which is moving into or through the United States or interstate, in bond or otherwise, and which he has reason to believe is infested by any noxious weed or contains any such weed, or which has moved into the United States, or interstate, and which he has reason to believe was infested by or contained any noxious weed at the time of such movement; and any noxious weed, product, article, or means of conveyance which is moving into or through the United States, or interstate, or has moved into the United States, or interstate, in violation of this Act or any regulation hereunder.

(b) Except as provided in subsection (c) of this section, the Secretary may order the owner of any product, article, means of conveyance, or noxious weed subject to disposal under subsection (a) of this section, or his agent, to treat, destroy, or make other disposal of such product, article, means of conveyance, or noxious weed, without cost to the Federal Government and in such manner as the Secretary deems appropriate. The Secretary may apply to the United States District Court, or to the United States court of any territory or possession, for the judicial district in which such person resides or transacts business or in which the product, article, means of conveyance, or noxious weed is found, for enforcement of such order by injunction, mandatory or otherwise. Process in any such case may be served in any judicial district wherein the defendant resides or transacts business or may be found, and subpenas for witnesses who are required to attend a court in any judicial district in such a case may run to any other judicial district.

(c) No product, article, means of conveyance, or noxious weed shall be destroyed, exported, or returned to shipping point of origin, or ordered to be destroyed, exported, or so returned under this section, unless in the opinion of the Secretary there is no less drastic action which would be adequate to prevent the dissemination of noxious weeds into the United States or interstate.

Civil action.

(d) The owner of any product, article, means of conveyance, or noxious weed destroyed, or otherwise disposed of, by the Secretary under this section, may bring an action against the United States in the United States District Court for the District of Columbia, within one year after such destruction or disposal, and recover just compensation for such destruction or disposal of such product, article, means of conveyance, or noxious weed (not including compensation for loss due to delays incident to determining its eligibility for movement under this Act) if the owner establishes that such destruction or disposal was not authorized under this Act. Any judgment rendered in favor of such owner shall be paid out of the money in the Treasury appropriated for administration of this Act.

Authorized inspectors.
7 USC 2801.

SEC. 7. Any authorized inspector, when properly identified, shall have authority (a) without a warrant, to stop any person or means of conveyance moving into the United States, and inspect any noxious weeds and any products and articles of any character whatsoever, carried thereby, and inspect such means of conveyance, to determine whether such person or means of conveyance is moving any noxious weed, product, article, or means of conveyance contrary to this Act or any regulation under this Act; (b) without a warrant, to stop any person or means of conveyance moving through the United States or interstate, and inspect any noxious weeds and any products and articles of any character whatsoever carried thereby, and inspect such means of conveyance, to determine whether such person or means of conveyance is moving any noxious weed, product, article, or means of conveyance contrary to this Act or any regulation thereunder, if such inspector has probable cause to believe that such person or means of conveyance is moving any noxious weed regulated under this Act; and (c) to

enter, with a warrant, any premises in the United States, for purposes of any inspections or other actions necessary under this Act. Any judge of the United States or of a court of record of any State, territory, or district, or a United States commissioner, may, within his respective jurisdiction, upon proper oath or affirmation showing probable cause to believe that there are on certain premises any products, articles, means of conveyance, or noxious weeds subject to this Act, issue warrants for the entry of such premises for purposes of any inspection or other action necessary under this Act, except as otherwise provided in section 9 of this Act. Such warrants may be executed by any authorized inspector or any United States marshal. Warrants, issuance.

SEC. 8. Any person who knowingly violates section 1 or 5 of this Act, or any regulation promulgated under this Act, shall be guilty of a misdemeanor and shall be punished by a fine not exceeding $5,000, or by imprisonment not exceeding one year, or both. Penalty. 7 USC 2807.

SEC. 9. (a) The Secretary is authorized to cooperate with other Federal agencies, agencies of States, territories, or districts, or political subdivisions thereof, farmers' associations, and similar organizations, and individuals in carrying out operations or measures in the United States to eradicate, suppress, control, or prevent or retard the spread of any noxious weed. The Secretary is authorized to appoint employees of other agencies of the Federal Government or any agencies of any State, territory, or district, or political subdivisions thereof, as collaborators to assist in administration of the provisions of this Act, pursuant to cooperative agreements with such agencies, whenever he determines that such appointments would facilitate administration of this Act. Federal agencies, cooperation. 7 USC 2808.

(b) In performing the operations or measures authorized by subsection (a) of this section, the cooperating State or other governmental agency shall be responsible for the authority necessary to carry out the operations or measures on all lands and properties within the State or other jurisdiction involved, other than those owned or controlled by the United States Government, and for such other facilities and means as in the discretion of the Secretary are necessary.

SEC. 10. The Secretary is authorized to promulgate regulations necessary to effectuate the provisions of this Act. However, any regulation identifying a noxious weed under section 4 of this Act shall be promulgated only after publication of a notice of the proposed regulation and, when requested by any interested person, a public hearing on the proposal. Any such regulation shall be based upon the information received at any such hearing and other information available to the Secretary and a determination by the Secretary that the plant is within the definition of a noxious weed in section 3(c) of this Act and that its dissemination in the United States may reasonably be expected to have, to a serious degree, any effect specified in section 3(c). Regulations. 7 USC 2809. Hearing.

SEC. 11. There are hereby authorized to be appropriated such sums as Congress may from time to time determine to be necessary for the administration of this Act. Any sums so appropriated shall be available for expenditures for the purchase, hire, maintenance, operation, and exchange of aircraft and other means of conveyance, and for such other expenses as may be necessary to carry out the purposes of this Act. However, unless specifically authorized in other legislation or provided for in appropriations, no part of such sums shall be used to pay the cost or value of property injured or destroyed under section 9 of this Act. Appropriation. 7 USC 2810.

Nonapplicability.
7 USC 2811.

SEC. 12. The provisions of this Act shall not apply to shipments of seed subject to the Federal Seed Act (53 Stat. 1275, as amended; 7 U.S.C. 1551 et seq.) and this Act shall not amend or repeal any of the provisions of said Act or of the Plant Quarantine Act of August 20, 1912 (37 Stat. 315, as amended; 7 U.S.C. 151–154, 156 164a, 167), the Federal Plant Pest Act (71 Stat. 31; 7 U.S.C. 150aa–150jj), or any other Federal laws.

7 USC 2812.

SEC. 13. The provisions of this Act shall not invalidate the provisions of the laws of any State or political subdivision thereof, or of any territory or district of the United States relating to noxious weeds, except that no such jurisdiction may permit any action that is prohibited under this Act.

Separability.
7 USC 2813.

SEC. 14. If any provision of this Act or the application thereof to any person or circumstances is held invalid, the remainder of the Act and the application of such provision to other persons and circumstances shall not be affected thereby.

Approved January 3, 1975.

APPENDIX B

PROPOSED SITES IDENTIFIED FOR TREATMENT

PROPOSED GROUND APPLICATION OF HERBICIDES
ALTERNATIVE #1
FORTINE RANGER DISTRICT

Project Name	Target Weed	Net Size Acre	Herbicide amount Rate (lbs/ac) 24-D	Picloram	Application Method
Cripple Creek Rd 857 R/W	Spotted Knapweed	5 ac		.25#	backpack spray
Laughing Water Creek Rd 7008, 5916 R/W	Spotted Knapweed	5 ac		.25#	backpack spray
Summit Creek Rd 1002 R/W	Spotted Knapweed	3 ac		.25#	backpack spray
Brimstone Creek Rd 865 R/W	Spotted Knapweed	3 ac		.25#	backpack spray
Stewart Creek Rd 36 R/W	Spotted Knapweed	1.7ac		.25#	backpack spray
Magnesia Creek Rd 3770 R/W	Spotted Knapweed	3 ac		.25#	backpack spray
Lewis Lake spot	Spotted Knapweed	.25ac	2#		wick appl/ hand grub.
SW SW SE 1/4 S.36 34N 26W Rd 36 R/W	Spotted Knapweed	.25ac		.25#	backpack spray
Jim Creek Rd 3730 R/W	Spotted Knapweed	2 ac		.25#	backpack spray
SW SW NE 1/4 S.26 34N 25W spot	Spotted Knapweed	.50ac		.25#	backpack spray
Rock Lake Rd 7978 spot	Spotted Knapweed	.50ac	2#		backpack spray
Timber Lake spot	Spotted Knapweed	.50ac	2#		wick appl/ hand grub.
Rd 756 R/W	Spotted Knapweed	2.5ac		.25#	backpack spray
Grave Creek Rd 114 R/W	Spotted Knapweed	2.5ac		.25#	backpack spray
N 1/2 NE S.8 35N 25W Rd 7019 R/W	Spotted Knapweed	.25ac		.25#	backpack spray
Rd 7066 R/W	Spotted Knapweed	.25ac 30.2 ac		.25#	backpack spray

PROPOSED GROUND APPLICATION OF HERBICIDES
ALTERNATIVE #2
FORTINE RANGER DISTRICT

Project Name	Target Weed	Net Size Acre	Manual/Mech.	Application Method
Cripple Creek Rd 857 R/W	Spotted Knapweed	5 ac		pulling/ grubbing
Laughing Water Creek Rd 7008, 5916 R/W	Spotted Knapweed	5 ac		pulling/ grubbing
Summit Creek Rd 1002 R/W	Spotted Knapweed	3 ac		pulling/ grubbing
Brimstone Creek Rd 865 R/W	Spotted Knapweed	3 ac		pulling/ grubbing
Stewart Creek Rd 36 R/W	Spotted Knapweed	1.7ac		pulling/ grubbing
Magnesia Creek Rd 3770 R/W	Spotted Knapweed	3 ac		pulling/ grubbing
Lewis Lake spot	Spotted Knapweed	.25ac		pulling/ grubbing
SW SW SE 1/4 S.36 34N 26W Rd 36 R/W	Spotted Knapweed	.25ac		pulling/ grubbing
Jim Creek Rd 3730 R/W	Spotted Knapweed	2 ac		pulling/ grubbing
SW SW NE 1/4 S.26 34N 25W spot	Spotted Knapweed	.50ac		pulling/ grubbing
Rock Lake Rd 7978 spot	Spotted Knapweed	.50ac		pulling/ grubbing
Timber Lake spot	Spotted Knapweed	.50ac		pulling/ grubbing
Rd 756 R/W	Spotted Knapweed	2.5ac		pulling/ grubbing
Grave Creek Rd 114 R/W	Spotted Knapweed	2.5ac		pulling/ grubbing
N 1/2 NE S.8 35N 25W Rd 7019 R/W	Spotted Knapweed	.25ac		pulling/ grubbing
Rd 7066 R/W	Spotted Knapweed	.25ac		pulling/ grubbing
		30.2 ac		

PROPOSED GROUND APPLICATION OF HERBICIDES
ALTERNATIVE #1
REXFORD RANGER DISTRICT

Project Name	Target Weed	Net Size Acre	Herbicide amount Rate (lb./ac) 24-D	Picloram	Application Method
W 1/2 S.30 36N 27W Rd 7185 R/W	Spotted Knapweed	1.4ac		.25#	backpack spray
NW NE 1/4 S.26 36N 27W 7284 R/W	Spotted Knapweed	.25ac		.25#	backpack spray
Phils Lake Rd 7293 R/W	Spotted Knapweed	.25ac	2#		backpack spray
Rd 7182 R/W & spot	Spotted Knapweed	2.0ac		.25#	backpack spray
Rd 3630 R/W	Spotted Knapweed	.5 ac		.25#	backpack spray
Gut Cr NW SW SW 1/4 S11 35N 28W Rd 7939 R/W	Spotted Knapweed	.5 ac		.25#	backpack spray
SE NE SE S.1 35N 28W Rd 7939 R/W	Spotted Knapweed	.5 ac		.25#	backpack spray
E 1/2 NE 1/4 S.12 35N 28W Rd 7987 R/W	Spotted Knapweed	1 ac		.25#	backpack spray
SW NE SW 1/4 S.12 35N 28W Rd 7987 R/W	Spotted Knapweed	.5 ac		.25#	backpack spray
NW SW 1/4 S.20 36N 28W Rd 7239 R/W	Spotted Knapweed	.5 ac		.25#	backpack spray
NW SW 1/4 S.20 36N 28W Rd 7239 R/W	Spotted Knapweed	.55ac		.25#	backpack spray
NE SE 1/4 S.19 36N 28W Rd 7239 R/W	Spotted Knapweed	.55ac		.25#	backpack spray
SE NW NE 1/4 S.36 36N 29W spot	Spotted Knapweed	.75ac		.25#	backpack spray
Fan Creek Rd 337 R/W	Spotted Knapweed	2 ac		.25#	backpack spray
FDR Rd 228 R/W	Spotted Knapweed	14 ac		.25#	truck sprayer

Project Name	Target Weed	Net Size Acre	Herbicide amount Rate (lbs/ac) 24-D	Picloram	Application Method
Alkali Lake spot	Spotted Knapweed	.25ac		.25#	backpack spray
S 1/2 S.12 27N 28W Rd 7186 R/W	Spotted Knapweed	.5 ac		.25#	backpack spray
NW 1/4 S.13 37N 28W Rd 852 R/W	Spotted Knapweed	.5 ac		.25#	backpack spray
Young Cr SE NW 1/4 S.17 37N 28W R.303 R/W	Spotted Knapweed	.5 ac		.25#	backpack spray
N 1/2 S.20 37N 28W Rd 7220 R/W	Spotted Knapweed	.6 ac		.25#	backpack spray
SW NW SW 1/4 S.35 37N 28W Rd 7220 R/W	Spotted Knapweed	.25ac		.25#	backpack spray
NW NE 1/4 S.3 36N 28W Rd 7213 R/W	Spotted Knapweed	.5 ac		.25#	backpack spray
S 1/2 SW 1/4 S.9 36N 28W Rd 7223 R/W	Spotted Knapweed	.5 ac		.25#	backpack spray
E 1/2 S.8 36N 28W Rd 7223 R/W	Spotted Knapweed	.7 ac		.25 #	backpack spray
NE NE 1/4 S.20 36N 28W Rd 596 R/W	Spotted Knapweed	.25ac		.25#	backpack spray
Swisher Lake spot	Spotted Knapweed	.25ac	2#		wick/ backpack
Rexford Bench spot	Spotted Knapweed	.25ac		.25#	backpack spray
Eureka Admin. Site spot	Spotted Knapweed	1 ac		.25#	wick/ backpack
Eureka Admin, Site site	Spotted Knapweed	10ac			tilling/ mowing

PROPOSED GROUND APPLICATION OF HERBICIDES
ALTERNATIVE #2
REXFORD RANGER DISTRICT

Project Name	Target Weed	Net Size Acre	Manual/Mech.	Application Method
W 1/2 S.30 36N 27W Rd 7185 R/W	Spotted Knapweed	1.4ac		pulling/ grubbing
NW NE 1/4 S.26 36N 27W 7284 R/W	Spotted Knapweed	.25ac		pulling/ grubbing
Phils Lake Rd 7293 R/W	Spotted Knapweed	.25ac	2#	pulling/ grubbing
Rd 7182 R/W & spot	Spotted Knapweed	2.0ac		pulling/ grubbing
Rd 3630 R/W	Spotted Knapweed	.5 ac		pulling/ grubbing
Gut Cr NW SW SW 1/4 S11 35N 28W Rd 7939 R/W	Spotted Knapweed	.5 ac		pulling/ grubbing
SE NE SE S.1 35N 28W Rd 7939 R/W	Spotted Knapweed	.5 ac		pulling/ grubbing
E 1/2 NE 1/4 S.12 35N 28W Rd 7987 R/W	Spotted Knapweed	1 ac		pulling/ grubbing
SW NE SW 1/4 S.12 35N 28W Rd 7987 R/W	Spotted Knapweed	.5 ac		pulling/ grubbing
NW SW 1/4 S.20 36N 28W Rd 7239 R/W	Spotted Knapweed	.5 ac		pulling/ grubbing
NW SW 1/4 S.20 36N 28W Rd 7239 R/W	Spotted Knapweed	.55ac		pulling/ grubbing
NE SE 1/4 S.19 36N 28W Rd 7239 R/W	Spotted Knapweed	.55ac		pulling/ grubbing
SE NW NE 1/4 S.36 36N 29W spot	Spotted Knapweed	.75ac		pulling/ grubbing
Fan Creek Rd 337 R/W	Spotted Knapweed	2 ac		pulling/ grubbing
FDR Rd 228 R/W	Spotted Knapweed	14 ac		pulling/ grubbing

Project Name	Target Weed	Net Size Acre	Manual/Mech.	Application Method
Alkali Lake spot	Spotted Knapweed	.25ac		pulling/ grubbing
S 1/2 S.12 27N 28W Rd 7186 R/W	Spotted Knapweed	.5 ac		pulling/ grubbing
NW 1/4 S.13 37N 28W Rd 852 R/W	Spotted Knapweed	.5 ac		pulling/ grubbing
Young Cr SE NW 1/4 S.17 37N 28W R.303 R/W	Spotted Knapweed	.5 ac		pulling/ grubbing
N 1/2 S.20 37N 28W Rd 7220 R/W	Spotted Knapweed	.6 ac		pulling/ grubbing
SW NW SW 1/4 S.35 37N 28W Rd 7220 R/W	Spotted Knapweed	.25ac		pulling/ grubbing
NW NE 1/4 S.3 36N 28W Rd 7213 R/W	Spotted Knapweed	.5 ac		pulling/ grubbing
S 1/2 SW 1/4 S.9 36N 28W Rd 7223 R/W	Spotted Knapweed	.5 ac		pulling/ grubbing
E 1/2 S.8 36N 28W Rd 7223 R/W	Spotted Knapweed	.7 ac		pulling/ grubbing
NE NE 1/4 S.20 36N 28W Rd 596 R/W	Spotted Knapweed	.25ac		pulling/ grubbing
Swisher Lake spot	Spotted Knapweed	.25ac		pulling/ grubbing
Rexford Bench spot	Spotted Knapweed	.25ac		pulling/ grubbing
Eureka Admin, Site site	Spotted Knapweed	10ac		tilling/ mowing

APPENDIX C

HUMAN HEALTH RISK ANALYSIS

HUMAN HEALTH RISK ANALYSIS FOR THE PROPOSED HERBICIDE SPRAY PROGRAM TO CONTROL NOXIOUS WEEDS ON THE KOOTENAI NATIONAL FOREST--FY1986

This analysis provides the worst-case risk to human health as a result of herbicide spray programs to control spotted knapweed, a noxious weed, on the Eureka and Fortine ranger districts of the Kootenai National Forest. The herbicide spray alternative proposes spraying the herbicides 2,4-D, dicamba (Banvel, tradename), and picloram (Tordon, tradename). The proposed selected areas include numerous small segments along roadside rights-of-way (R-O-W) totalling about two miles, and several small infested areas scattered throughout disturbed areas (riparian/forest/open range) on both districts (see Table 1).

Application would involve roadside R-O-W work, using either a backpack sprayer or a vehicle-mounted tank sprayer. Spot application for the small, isolated areas would be accomplished by back-pack spraying or by wick application. Certified Forest Service personnel would be used. Either 2,4-D or a 2,4-D/dicamba mixture (3:1 ratio) would be used near watercourses. For the sake of this analysis, it will be assumed 2,4-D/dicamba will be used. Picloram would be applied to the drier sites.

Analyses of human health impacts are provided for the worst-case example of each type of project. These examples are defined on the basis of proximity to water and human residents, size of the spray area, and amount of herbicide used.

Table 1 shows all of the project sites proposed for herbicide spraying on the Forest for 1986.

Table 1. Proposed Ground Application of Herbicides (Alt. #1)

Project Name	Net Size (Acres)	Herbicide Rate (Lbs/Acre)	Application Method
1. Rd 7185 R-O-W, 36N27WS30W1/2	1.4	.25	Backpack
2. Rd 7284 R-O-W, 36N27WS26NW1/4NE1/4	.25	.25	Backpack
3. Phills Lake, Rd 7293	.25	2.0	Backpack
4. Rd 7182 R-O-W	2.0	.5	Backpack
5. Rd 3630 R-O-W	.5	.25	Backpack
6. Gut Creek, Rd 7939 R-O-W	.5	.25	Backpack
7. Rd 7939 R-O-W	.5	.25	Backpack
8. Rd 7987 R-O-W, 35N28WS12E1/2NE1/4	1.0	.25	Backpack
9. Rd 7987 R-O-W, 35N28WS12SW1/4NE1/4SW1/4	.5	.25	Backpack
10. Rd 7239 R-O-W, 36N28WS20NW1/4SW1/4	.5	.25	Backpack
11. Rd 7239 R-O-W, 36N28WS20NW1/4SW1/4	.55	.25	Backpack
12. Rd 7239 R-O-W, 36N28WS19NE1/4SE1/4	.55	.25	Backpack
13. Spot, 36N29WS36SE1/4NW1/4NE1/4	.75	.25	Backpack
14. Fan Creek, Rd 337 R-O-W	2.0	.25	Backpack
15. FDR (Rd 228) R-O-W	14.0	.25	Truck
16. Alkali Lake	.25	.25	Backpack
17. Rd 7186 R-O-W	.5	.25	Backpack

Table 1. (Cont'd)

Project Name	Net Size (Acres)	Lbs/Acre	Application Method
18. Rd 852 R-O-W	.5	.25	Backpack
19. Young Creek, Rd 303 R-O-W	.5	.25	Backpack
20. Rd 7220 R-O-W, 37N28WS20N1/2	.6	.25	Backpack
21. Rd 7220 R-O-W, 37N28WS35SW1/4NW1/4SW1/4	.25	.25	Backpack
22. Rd 7213 R-O-W	.5	.25	Backpack
23. Rd 7223 R-O-W 36N28WS9	.5	.25	Backpack
24. Rd 7223 R-O-W 36N28WS8	.7	.25	Backpack
25. Rd 596 R-O-W	.25	.25	Backpack
26. Swisher Lake	.25	2.0	Backpack/Wick
27. Rexford Bench	.25	.25	Backpack/Wick
28. Eureka Admin. Site	1.0	.25	Backpack/Wick
29. Cripple Creek, Rd 857	5.0	.25	Backpack
30. Laughing Water Creek, Rd 7008,5916 R-O-W	5.0	.25	Backpack
31. Summit Creek, Rd 1002 R-O-W	3.0	.25	Backpack
32. Brimstone Creek, Rd 865 R-O-W	3.0	.25	Backpack
33. Stewart Creek, Rd 36 R-O-W	1.7	.25	Backpack
34. Magnesia Creek, Rd 3770 R-O-W	3.0	.25	Backpack
35. Lewis Lake	.25	2.0	Wick/Hand Grub
36. Rd 36 R-O-W	.25	.25	Backpack
37. Jim Creek, Rd 3730 R-O-W	2.0	.25	Backpack
38. Spot, 34N25WS26SW1/4SW1/4NE1/4	.5	.25	Backpack
39. Rock Lake, Rd 7978 (Spot)	.5	2.0	Backpack
40. Timber Lake	.5	2.0	Wick/Hand Grub
41. Rd 756 R-O-W	2.5	.25	Backpack
42. Grave Creek, Rd 114 R-O-W	2.5	.25	Backpack
43. Rd 7019 R-O-W	.25	.25	Backpack
44. Rd 7066 R-O-W	.25	.25	Backpack

As indicated on Table 1, the areas proposed for treatment are small and scattered throughout Forest Service land. Most are isolated from general human activity and aquatic areas. Four areas that may constitute the highest risk to the public and herbicide applicators are:

1. Spot treatment (riparian/forest) next to Rock Lake (four miles south of Eureka).
   a. No fish (too alkaline), but other aquatic-related wildlife present.
   b. U.S. Forest Service campground encompasses treatment area.
   c. Lost Lake is 1/4 mile southwest--no fish (too alkaline).

2. Spot treatment (riparian/forest) next to Alkali Lake (near Tooley Lake).
   a. No fish (too alkaline), but waterfowl present and presumed hunted.
   b. Private residence 1/4 mile north of spray area.
   c. Turtles, salamanders, and other aquatic-related wildlife present.

3. Roadside R-O-W treatment on road to Black Butte (Rd 7185).
   a. 1/4 mile southwest of private residences.
   b. 1/3 mile west of potential livestock pasture.

4. Roadside R-O-W treatment close to Phills Lake.
   a. Fishery lake.
   b. Abundant use by waterfowl (presumed hunted).
   c. Dispersed summer and fall recreation.
   d. Aquatic-related wildlife present.

The Rock Lake site was selected as the spraying project with the highest potential for human health risks for a forest/riparian/open range situation. The right-of-way project with the greatest potential for human health impacts is considered the Road 7185 proposal. Any identifiable concerns in the remaining two projects will be addressed throughout this analysis.

Worst-Case Riparian/Forest Project (2,4-D/Dicamba)

The worst-case open range/forest project selected for analysis is the Rock Lake proposal. This project proposes spraying 1.0 pound of 2,4-D/dicamba mixture onto a very small area (0.5 acre) in a designated campground to control the spread of spotted knapweed. The closest human residence is 1/4 mile upwind of the project area. Rock Lake is adjacent to the treatment site with Lost Lake 1/4 mile to the southwest. Both lakes were stocked with game fish in the past but due to receding water levels in recent decades the aquatic environment of each has become too alkaline to support any populations of fish. A U.S.F.S. campground exists at the site. Use of this facility has decreased due to loss of the Rock Lake fishery, but it is still used for general recreation, to include swimming, and to access other fish-supporting lakes nearby.

The development of the following analysis is derived from a document in the decision file entitled, "Analysis of Human Health Risks of USDA Forest Service Use of Herbicides to Control Noxious Weeds in the Northern Region", (Background Document). This Background Document is attached to the DEIS.

The following paragraphs analyze selected scenarios that may result in exposure of humans to a given herbicide.

The worst-case analysis will be based on backpack spraying of 2,4-D/dicamba in a campground setting next to a fish-supporting lake. It will be assumed the sprayed area would be visited by recreationists immediately after spraying. It will also be assumed that a fisherman catches and consumes 1.1 pounds (0.5 kg) of fish in a day.

As described in Section 2.4.3.4 of the Background Document supplementing this EIS, several studies of herbicide residue in spray areas indicate that the herbicide dosage to persons re-entering a spray area is likely to be very small. It was found that only five percent of 2,4-D applied to grasses could be removed by mechanical wiping immediately after spraying one to two pounds active ingredient (a.i.) per acre. These residues dropped to less than one percent by five days following application. These data indicate the exposure to herbicides from contacting treated foliage would be extremely small. The worst-case dose levels for visitors re-entering a site sprayed with 2,4-D/dicamba would be 6.0×10^{-3} mg/kg and 3.0×10^{-2} mg/kg* (respectively). These doses are over 16,000 times less than levels that had

*Dose levels are given as milligrams of herbicide to kilograms of body weight.

effects on animals in long-term dosing studies and over 160 times less than EPA's Acceptable Daily Intake (ADI) for these herbicides. Table 2 provides the ADI values for these herbicides. It should also be noted that the ADI values assume that a person received a dose every day for a lifetime. Higher doses can be tolerated for shorter time periods.

Table 2. EPA's Acceptable Daily Intake (ADI)--Lifetime Exposure With No Ill Effects

Herbicide	ADI Values (Mg/kg/day)
2,4-D	1.0×10^{-2} (0.01)
Dicamba	1.25×10^{-2} (0.0125)
Picloram	2.5×10^{-2} (0.025)

In reality the Forest Service would temporarily close the campground and post warning signs as necessary. Drift would be minimal as spraying would be conducted when winds are near non-existent and would most likely be accomplished with a wick applicator.

This analysis assumes that one percent of the campground visitors collect 0.5 pounds of edible plants from the treated area. This is a liberal estimate since prime foraging areas, such as huckleberry fields, are not located in habitats which have seen incursions of noxious weeds. Also, the U.S.F.S. recreation records indicate less than one percent of forest visitors gather edible wild foods.

As discussed in Section 2.4.3.4 of the Background Document, the maximum herbicide concentration on sprayed wild food would be 7.0 mg/kg for each pound of herbicide applied. Based on an assumed application rate, including major mixing errors, of 1.8 pounds per acre 2,4-D and 0.9 pounds of dicamba, the doses to a 152 pound (70 kg) person collecting and eating 0.5 pounds sprayed wild foods would be 0.042 mg/kg and 0.021 mg/kg (2,4-D, dicamba, respectively--see Table 2.14 of Background Document). This is slightly above the acceptable daily intake or ADI (Table 2) for people consuming 2,4-D/dicamba as outlined in the Background Document. However, for reasons defined the chances of any person actually approaching this level are extremely remote.

These visitor doses are extreme estimates. The chances of picking and consuming 1/2 pound of wild foods only from a site of noxious weeds that has been directly sprayed with herbicides are extremely small. Also the distasteful odor and flavor of the vegetation alone would alert people to contamination problems.

The hunting season would not begin until a minimum of four months and extend as long as six months after treatment because spraying for noxious weeds occurs in spring and early summer. The small percentage of Forest Service land sprayed, the wide-ranging habits of big game animals, and the time intervals between spraying and the hunting season serve to make impacts from eating wild game which may have grazed on herbicide-treated grass negligible by comparison to the worst-case impacts from beef (as demonstrated in the R-O-W analysis following). Waterfowl frequent Rock Lake, but only for a short time during

hunting season due to fall freezing of the lake. Many waterfowl in the area are migrants and spend but a short time at the site, arriving to the site two to three months after the spray project has been completed. Certain compounds, such as endrin, bioaccumulate in the fat and organ tissue of waterfowl which are generally discarded by the hunters prior to eating (Montana Department of Fish, Wildlife, and Parks recommends against the consumption of these parts on all game birds and distributes warnings to sportsmen as a matter of policy). However, the herbicides planned for application on the Kootenai NF do not bioaccumulate in body tissues.

The worst-case daily dose of 2,4-D/dicamba involving drinking water would be very small. Rock Lake is about 30 acres and averages about 5 feet in depth; therefore, is about 180,600,000 liters in volume. Assuming 2% of herbicide enters the lake in 24 hours from a major storm (Background Document, Section 2.4.6.4), the dilution of 2,4-D/dicamba would be 5.0×10^{-8} mg/kg (3.8×10^{-8} mg/kg for 2,4-D and 1.2×10^{-8} for dicamba), a very small amount. If a person weighing 70 kg drinks 2 liters of lake water daily, the daily dose would be 1.1×10^{-9} mg/kg for 2,4-D and 3.5×10^{-10} mg/kg for dicamba, well below the ADI. In addition, due to the alkaline nature of the water, consumption would be most undesirable, although some ingestion of water from swimming may occur.

Neither 2,4-D nor dicamba bioaccumulate in aquatic organisms. The worst-case daily concentration for fish in the lake would be no greater than that of the water concentration, which is 5.0×10^{-8} mg/kg for the mixture. If a fisherman consumes .5 kg of fish in a day, this would provide a dose of 1.9×10^{-8} mg/kg for 2,4-D and 6.3×10^{-9} mg/kg for dicamba, well below the recommended ADI levels. The chance of consuming this much herbicide at the Rock Lake site by eating fish is nonexistent as the fish population has died out due to increased alkalinity of the water. The effect of these doses are below ADI. [This low concentration would be similar to the worst-case situation for the Phills Lake project which does support fish].

As discussed in Section 2.7.8. of the Background Document, 2,4-D was assumed to be a carcinogen. Under this assumption, cancer probabilities for the general public and workers in the vicinity of a riparian project sprayed with 2,4-D/dicamba are shown in Table 3 (e.g. $4.9 \times 10^{-12} = 49$ chances out of one trillion).

Table 3. Cancer Probabilities for the General Public and Workers in the Vicinity of Riparian Projects Sprayed With 2,4-D/Dicamba

Situation	2,4-D/Dicamba
Adult dermal dose	4.9×10^{-12}
Adolescent dermal dose	4.7×10^{-9}
Infant dermal dose	1.2×10^{-11}
Adult oral dose (water)	7.1×10^{-10}
Adolescent oral dose (water)	9.3×10^{-10}
Infant oral dose (water)	1.0×10^{-9}
Adult/adolescent oral dose (fish)	1.2×10^{-11}
Infant oral dose (fish)	1.4×10^{-11}
Visitor re-entry	2.2×10^{-10}
Spot sprayer (worker)	9.7×10^{-8}

Right-of-Way (Picloram)

The actual worst-case roadside right-of-way project selected for this analysis is that proposed for Road 7185 near Black Butte. Picloram at a mixture of 0.25lbs. a.i. per acre will be applied along selected reaches on a road stretch totalling 1.4 acres. Application will be by vehicle-mounted pumper. Private land lies adjacent to the project but is unoccupied. At least two private residences are 1/4 mile northeast of the upper end of the project. A potential livestock pasture exists 1/3 mile east of the project. Public use of the road is light.

The analysis for a R-O-W application will assume a worse-case situation that private land with a residence of four inhabitants (two adults, one adolescent, and one infant) is adjacent to the project site, with the residence approximately 60 meters (200 feet) from the spray activity. It is assumed that the residence with its inhabitants would be directly downwind during spraying. The inhabitants would be outside during spray activity. It is assumed that this family has a vegetable garden and steer for family consumption in the path of herbicide drift. Application would be by vehicle-mounted spray tank. Picloram would be used.

The steer would be slaughtered immediately after it has grazed solely on herbicide-treated grass for a sufficient time to allow maximum accumulation of herbicide in body tissues. The beef would provide the sole source of meat for these inhabitants for 125 days.

Neither 2,4-D/dicamba or picloram bioaccumulate to any extent in mammalian or aquatic species and are eliminated rapidly after ingestion. Impacts on animals are quite transient and a secondary human dose of herbicides could only occur if the animals are slaughtered shortly after exposure.

Worst-case dosage to cattle foraging on herbicide-contaminated grass is calculated in the Background Document (see Section 2.4.6.3 and Section 2.4.2).

Picloram is excreted very rapidly from mammalian systems. The Background Document (Section 2.4.2) states that more than 70 percent of a human oral dose of 5.0 mg/kg can be recovered in urine in six hours. Also ninety percent of the compound fed to dogs is excreted within 48 hours. It was found that cattle fed from one to 1600 mg/kg of picloram in feed for 4.5 to 8 weeks showed 0.05 to 0.5 mg/kg in muscle and fat, 0.12 to 2.0 mg/kg in liver, and 2.0 to 18 mg/kg in kidneys. Kidneys contained less than 0.1 mg/kg if picloram was withdrawn from the diet three days before slaughter. Dicamba and 2,4-D show similar reduction by excretion.

Based on maximum steady-state concentrations of herbicides in cattle grazing near right-of-way projects, the secondary dose to adults, adolescents, and infants consuming this beef can be calculated. As shown on Table 2.3.2 of the Background Document, picloram dose to adults and adolescents would be 7.1×10^{-6} mg/kg. The infant dose would be 8.3×10^{-6} mg/kg.

In this analysis, adults are assumed to consume daily eight ounces of vegetables from a garden downwind of the spray zone. Assuming, as a worst case, that no herbicide is lost in washing and cooking, the daily picloram dose to an adult or adolescent would be 5.1×10^{-4} mg/kg; an infant would be 6.5 X

10^{-4} mg/kg (see Table 2.32 of the Background Document).

It is assumed that herbicide concentration does not diminish over a two-week period during which residents continue to consume vegetables. In fact, a combination of washing vegetables, irrigation and/or rain, photochemical degradation, and new growth will effectively reduce intake of herbicides to near zero.

Dermal absorption of drift by neighboring residents was calculated on the assumption that all residents were outside their residence during the entire spray episode. All exposed skin is assumed to be directly in the drift pathway and fully exposed to drift (a rather extreme assumption). As calculated in Section 2.4.6.2 of the Background Document, the dose to an adult from a 1.2 pound per acre application of picloram would be 2.0×10^{-6} mg/kg. As worst-case it is assumed that an adolescent is attracted by sight and sound of spray operation and walks within one meter of spray operation. It is calculated in Section 2.4.6.2 that the dermal dose for drift for this individual would be 1.9×10^{-3} mg/kg.

Worst-case dose levels to residents living near a right-of-way project where picloram is used are shown in Table 4.

Table 4. Worst-Case Dose Levels to Residents Near a Right-of-Way Project Sprayed With Picloram.

Situation	Dose Including Major Mixing Error (Mg/Kg)
Adult dermal dose	2.0×10^{-6}
Adolescent dermal dose	1.9×10^{-3}
Infant dermal dose	4.8×10^{-6}
Adult/adolescent oral dose (beef)	7.1×10^{-6}
Infant oral dose (beef)	8.3×10^{-4}
Adult/adolescent oral dose (veg)	5.1×10^{-4}
Infant oral dose (veg)	6.5×10^{-4}

All of the above doses, and any combination of doses, are below ADI levels.

Tables 5 shows the probabilities for people acquiring cancer as a result of the described situation (e.g. 4.4×10^{-14} = 44 chances out of 100 trillion).

Table 5. Cancer Probabilities for Visitors, Residents, and Workers in the Vicinity of a Right-of-Way Project Using Picloram (Lifetime Probability Assuming Major Mixing Error)

Situation	Probability
Adult dermal dose	4.4×10^{-14}
Adolescent dermal dose	4.2×10^{-11}
Infant dermal dose	1.1×10^{-13}
Adult/adolesent oral dose (beef)	2.2×10^{-11}
Infant oral dose (beef)	2.6×10^{-11}
Adult/adolesent oral dose (veg)	2.8×10^{-10}

Table 5. (Cont'd)

Situation	Probability
Infant oral dose (veg)	3.5×10^{-10}
Visitor re-entry	2.0×10^{-11}
Spot sprayer (worker)	8.9×10^{-9}
Truck driver (worker)	1.8×10^{-9}

Worker Dose

The spot treatments for the forest/riparian areas on the Forest will be accomplished by backpack spraying and/or wick application. In all cases, one, possibly two, certified applicators will be involved. Right-of-way application will probably be done using a combination of vehicle-mounted boom sprayer and hand-held nozzle.

Table 2.4 of the Background Document provides the worst-case dose factors to be used in calculating worker doses. These factors are based on workers backpack spraying, using little protective clothing and spraying brush fields five to seven feet high. Worker clothing is often saturated with sweat and herbicide by the end of the day. By contrast, most target plants to be treated on the Kootenai will be less than three feet high, thus little blow-back to the applicator is expected.

Relatively simple hygiene practices such as wearing clean gloves every day, washing hands before meals, and avoiding sprayed areas could considerably reduce worker dose. In this analysis it will be assumed these practices would not be followed.

The worker dose factors of Table 2.4 of the Background Document are intended to be multiplied by the amount of herbicide applied in a day by a worker to give the worst-case worker dose.

Based on the above discussion and the Background Document, Table 6 illustrates the worst-case doses for workers using 2,4-D or dicamba.

Table 6. Worse-case Doses for Workers Using 2,4-D or Dicamba

Worker Type	Dose $(Mg/Kg)_3$
Truck driver	6.8×10^{-4}
Mixer/loader	9.0×10^{-2}
Backpack sprayer	2.0×10^{-5}
Observer	1.2×10^{-5}

Picloram is not included but has been found to be dermally absorbed at a rate considerably less than that for 2,4-D. The dose for the worst-case situation of the backpack applicator exceeds the ADI level. Proper supervision and good hygiene practices would in reality significantly reduce this dose level. In addition, application may be with a wick applicator which would subject the worker to less exposure than a backpack unit.

Tank Truck Spills

The probability of an herbicide spill resulting from an incident involving an herbicide conveyance vehicle is discussed in the Background Document (Section 3.2).

According to Department of Transportation statistics, the mean probability of a single unit truck becoming involved in an accident is 4.6×10^{-7} accidents per mile traveled. The probability of an herbicide being released into the environment from any accident type is 1.4×10^{-7} spills by vehicle accident per mile traveled.

The chance of a spill from a truck accident occurring during the proposed spray project on the Kootenai NF is quite remote. In reality, very few miles are anticipated for truck use during the project spray activities for 1986.

General Discussion

The dose levels used in this analysis were determined through the use of small test animals. Because these organisms have a large surface to volume ratio, they are six to 12 times more sensitive to the various doses applied than humans. However, humans would be about 10 times more sensitive than these animals if size was not a factor. Also, the sensitivity variance among humans expands a ten-fold range. Therefore, EPA has incorporated a safety factor of 100 (10 X 10) to account for these two factors.

An important point is that the acceptable daily intake (ADI) used in this analysis is for lifetime exposure, whereas worst-case levels are for very short periods of exposure. Length of time a person would be exposed in any of the spray programs on the Forest will be for a short term, allowing for a higher ADI.

Presently, there is not any supporting evidence that picloram is carcinogenic. Nonetheless, for the sake of this analysis it has been assumed that picloram is a carcinogen.

Conclusion

Several conclusions can be drawn from this analysis. First, all figures are for worst-case situations and any precaution taken will decrease the risk level. Second, all workers must be advised explicitly of the hazards of these chemicals and instructed in the careful herbicide application techniques in order to reduce dose levels below ADI and worst-case values. Proper supervision of workers cannot be overemphasized. Thirdly, due to the sensitivity of pregnant women to herbicide exposure, women of child-bearing age should be restricted from applying herbicides. Lastly, as a margin of safety, no individual workers should be allowed to apply herbicides for more than 10 days on the Forest.

The estimated incremental lifetime cancer risks to workers and individuals in the general population are all less than one chance in a million. The calculation of the probability of cancer is based on a cancer model that

overestimates risks, and these risks are below that associated with natural background radiation that people encounter on a daily basis. This level of cancer has also been accepted by other Federal agencies such as FDA and EPA.

APPENDIX D

DIOXIN

APPENDIX D

TOXICITY OF DIOXINS IN HERBICIDES PROPOSED FOR USE

(From Northwest Area Noxious Weed Control Program EIS, BLM, 12/85)

Much confusion exists because of the use and misuse of the term dioxin. The term can refer to any one of about 75 polychlorinated dibenzodioxins (PCDD). But to many people, dioxin has become synonymous with 2,3,7,8-T4CDD, the only known dioxin with toxicity of any significance. The confusion has been compounded by free use of the abbreviations DCDD (for dichlorodibenzodioxin) and TCDD (for tetrachlorodibenzodioxin). There are 22 compounds of tetrachlorodibenzodioxins, and each compound acts differently in the environment. Common use of the term TCDD to mean 2,3,7,8-tetrachlorodibenzo-p-dioxin has caused some readers to assume all TCDDs are of the same toxicity, which is not the case. For example, 2,4-D studies have found traces of several dichloro-, trichloro-, and tetrachlorodibenzo-p-dioxin impurities, but none are thought to be particularly toxic (NRCC 1981). Recent studies, such as the 1981 Canadian publication "Polychlorinated Dibenzo-p-Dioxins: Criteria for their Effects on Man and His Environment" (NRCC 1981), refer to each specific PCDD by name, which clears up much of the confusion.

Manufacturing processes have been refined over the past few years to reduce impurities. A trade memorandum from Agriculture Canada's Food Production and Inspection Branch, dated August 28, 1981, stated, "Through this review, it has been possible to identify certain technical products that can be expected to be virtually free of PCDDs" (NRCC 1981).

Of the herbicides proposed for use by alternatives discussed in this EIS, only 2,4-D has been found to contain dioxins, and these dioxins are practically nontoxic (NRCC 1981). The following discussions have been extracted and included here for clarification. The term TCDD used in the extracts refers to 2,3,7,8-T4CDD.

Impurities occur in many organic synthesis procedures. Dioxins are among the trace impurities in all the phenoxys. There are 75 chlorinated dibenzodioxins, of which many occur in the chlorinated phenols and products made from them. Three dioxins have been found in 2,4-D, of which all are of limited toxicity. The initial finding of chlorodioxins in 2,4-D of Canadian manufacture (Cochrane and others 1980) showed substantial levels in certain formulations. U.S. EPA immediately assayed 30 formulations manufactured in the U.S. and in 3 samples found traces of 2,7-dichlorodibenzo-p-dioxin, the species to be expected in 2,4-D manufacture. No sample contained more than 60 ppb, which does not represent a toxicologic concern.

Extract from DOE, BPA 1983, page A-145. Chlorodibenzodioxins other than TCDD are of less concern because of low toxicity. Schwetz and others (1973) reported that 2,4-dichlorodibenzo-p-dioxin and octachlorodibenzo-p-dioxin have low toxicity whereas TCDD was extremely toxic. Low dosages of TCDD (0.0005 to 0.001 mg/kg/day) were toxic to rats, whereas 1,2,3,4-tetrachlorodibenzo-p-dioxin, 2,7-dichlorodibenzo-p-dioxin, 2,3-dichlorodibenzo-p-dioxic, and 2-chlorodibenzo-p-dioxin at dosages up to 2 mg/kg/day had little or no effect (Khera and Ruddick 1973).

2,4-D is synthesized from 2,4-dichlorophenol and therefore does not contain TCDD (Bovey and Young 1980). Three other chlorodibenzodioxins of low toxicity have been found in 2,4-D manufactured in Canada (Cochrane and others 1980). Analysis of 30 U.S. samples of 2,4-D revealed 2,7-dichlorodibenzo-p-dioxin in three formulations. No sample contained more than 60 ppb of 2,7-dichlorodibenzo-p-dioxin, which does not represent a toxicologic concern (Newton and Dost 1981). As part of the National Cancer Institude bioassay, a 2-year feeding study was conducted. Male and female rats and mice were fed 10 ppm (10,000 ppb) 2,7-dichlorodibenzo-p-dioxin. The panel of the National Cancer Institute concluded that 2,7-dichlorodibenzo-p-dioxin was not a carcinogen.

APPENDIX E

THREATENED AND ENDANGERED SPECIES

(As identified by Fish & Wildlife Service)

APPENDIX E

LIST OF THREATENED AND ENDANGERED SPECIES WHICH MAY BE PRESENT IN PROJECT AREAS AS IDENTIFIED BY FISH & WILDLIFE

Listed Species	Expected Occurrence
Grizzly bear (*Ursus arctos horribilis*)	Resident
Gray wolf (*Canis lupis*)	Potential resident,transient
Bald eagle (*Haliaeetus leucocephalus*)	Potential resident, migrant
Peregrine falcon (*Falco peregrinus*)	Migrant

Proposed Species

None

APPENDIX F

PLANT SPECIES OF SPECIAL CONCERN
WHICH MAY BE PRESENT IN THE PROJECT AREA

APPENDIX F

SUMMARY INFORMATION--Plant Species of Special Concern: Rexford and Fortine Ranger Districts, Kootenai National Forest, Lincoln and Flathead Counties, Montana.

I. Special concern species currently known to occur within the administrative boundaries of the Rexford and Fortine Ranger Districts (element occurrence records enclosed):

a. Silene spaldingii (Caryophyllaceae) - Spalding campion - Fescue grasslands at low elevations.

b. Geocaulon lividum (Santalaceae) - Northern bastard-toadflax - Moist coniferous forests at lower elevations.

c. Cypripedium parviflorum (Orchidaceae) - Small yellow lady's slipper - Moist spruce forest.

Both occurrences are located on private land, but these species may occur on Kootenai National Forest land; additional field surveys would be necessary to search for such occurrences. Silene spaldingii is listed by the U.S. Fish and Wildlife Service as a Category 2 species (=federal candidate: "Taxa for which information now in possession of the Service indicates that proposing to list them as endangered or threatened species is possibly appropriate, but for which substantial data on biological vulnerability and threat(s) are not currently known or on file to support the immediate preparation of rules."). Geocaulon lividum, though more common elsewhere, is critically endangered in Montana (fewer than five known occurrences).

II. Special concern species not currently known to occur within the Rexford and Fortine Ranger Districts, but which occur in adjacent Lincoln and Flathead Counties:

Allium fibrillum (Liliaceae) - Fringed onion
-Moist, open slopes at mid-elevations in the mountains.

Asplenium trichomanes (Aspleniaceae) - Maidenhair spleenwort
-Rock crevices and talus slopes, usually where moist.

Botrychium montanum (Ophioglossaceae) - Mountain moonwort
-Meadows and moist coniferous forests, low elevations to subalpine.

Brasenia schreberi (Nymphaeaceae) - Water-shield
-Ponds and streams at lower elevations.

Carex sycnocephala (Cyperaceae) - Many-headed sedge
-Moist meadows at low elevations.

Cypripedium passerinum (Orchidaceae) - Bird's egg lady's-slipper
-Moist to wet spruce forests, in calcareous areas at lower elevations.

Delphinium burkei (Ranunculaceae) - Meadow larkspur
-Moist meadows at lower elevations.

Dryopteris cristata (Aspleniaceae) - Buckler fern
-Wet meadows and cliffs at low to mid-elevations.

Elodea nuttallii (Hydrocharitaceae) - Nuttall's waterweed
-Ponds, lakes and streams at low elevations.

Erythronium grandiflorum var. candidum (Liliaceae) - White glacierlily
-Meadows and open woods at low elevations.

Goodyera repens (Orchidaceae) - Northern rattlesnake plantain
-Open coniferous forests at lower elevations.

Halenia deflexa ssp. deflexa (Gentianaceae) - Spurred gentian
-Moist soil at low to mid-elevations.

Lomatium geyeria (Apiaceae) Geyer's biscuitroot
-Open slopes at low elevations.

Lycopodium obscurum (Lycopodiaceae) - Groundpine
-Coniferous forests at low elevations.

Nymphaea tetragona (Numphaeaceae) - Pygmy water-lily
-Ponds and sloughs at low elevations.

Scirpus subterminalis (Cyperaceae) - Water clubrush
-Standing water of lakes and streams at low elevations.

Viola renifolia (Violaceae) - Kidney-leaved violet
-Moist coniferous woods at low to mid-elevations.

Wolffia columbiana (Lemnaceae) - Columbia watermeal
-Ponds and sloughs at low elevations.

Though not currently known on the Rexford and Fortine Districts, field surveys would be needed to determine the presence or absence, and population status, of any undiscovered sites for these 18 taxa which may be within the districts.

A useful additional reference is:

Lesica, P., G. Moore, K.M. Peterson, and J.H. Rumely (Montana Rare Plant Project). 1984. Vascular plants of limited distribution in Montana. Vol. 43, Monograph No. 2, Montana Academy of Sciences, Supplement to the Proceedings. 61 pp.

J. Stephen Shelly
Botanist
19 February 1986

Appendix G

Comment Letters

This appendix contains comment letters received on the DEIS from cooperating agencies and organizations. Over 100 copies of the DEIS were mailed out to various state and federal agencies, private individuals, and organizations.

Each response has been assigned a letter number.

Letter No.	Agency, organization or Individual
1	Board of Lincoln County Commissioners
2	Montana House of Representatives - Rep. Mary Lou Peterson.
3	United States Department of the Interior, Fish and Wildlife Service, Ecological Services.
4	Montana Wilderness Association
5	Environmental Protection Agency - Region 8.
6	Cooperative Extension Service, Montana State University, Lincoln County Extension Agent.
7	State of Montana - Department of Highways
8	United States Department of the Interior Fish and Wildlife Service, Endangered Species Field Office.
9	State of Montana - Department of Agriculture, Environmental Management Division.

1

BOARD OF COUNTY COMMISSIONERS

LINCOLN COUNTY
STATE OF MONTANA

DISTRICT NO. 1 LIBBY
JIM R. MOREY

DISTRICT NO. 2 TROY
R. W. LINDSEY

DISTRICT NO. 3 EUREKA
NOEL E. WILLIAMS

CLERK OF THE BOARD AND COUNTY RECORDER, JANET [illegible]
512 CALIFORNIA AVENUE
LIBBY, MONTANA 59923

May 7, 1986

James F. Rathbun
Forest Supervisor
Kootenai National Forest
506 U.S. Highway 2 West
Libby, Montana 59923

RE: EIS-KNF Noxious Weed Treatment Program

Dear Mr. Rathbun:

We heartily endorse Kootenai National Forest's efforts to establish a formal weed treatment and control program on the Rexford and Fortine Ranger Districts. Our weed board has established the Tobacco Valley area, which is surrounded by these two districts, as its major target area in Lincoln County's control program. Our efforts would be greatly enhanced by, most particularly, Alternative 3 as outlined in your EIS.

In the past, much of our effort (mandated by state law) has been negated due to the lack of any organized effort on adjacent federal lands; also, many private landowners have been reluctant to cooperate fully with us for the same reason. Now, however, perhaps we can look forward to a much stronger, more coordinated, and thus more effective program as a result of your potential increased capacity to take action.

Yours very truly,

BOARD OF LINCOLN COUNTY COMMISSIONERS

R. W. LINDSEY, Chairman

NOEL E. WILLIAMS, Member

JIM R. MOREY, Member

cc: Michael V. O'Farrell, EIS Team Leader

jo

2

The Big Sky Country

MONTANA HOUSE OF REPRESENTATIVES

REPRESENTATIVE MARY LOU PETERSON
HOUSE DISTRICT NO. 1
HELENA ADDRESS:
CAPITOL STATION
HELENA, MONTANA 59620
HOME ADDRESS:
[illegible]
EUREKA, MONTANA 59917
PHONE [illegible]

COMMITTEES:
STATE ADMINISTRATION
NATURAL RESOURCES
HIGHWAYS AND TRANSPORTATION

May 12, 1986

Dear Supervisor Rathbun,

Many thanks for sending me a copy of the Kootenai EIS for treatment of noxious weeds on the Rexford and Fortine Districts.

Many thanks also for your efforts to produce this document and for your plans to address spotted knapweed. Your plans for backpack spraying, truck application, and pulling/grubbing make sense to me. Your program will complement the state and county weed programs. As a matter of fact, I'm just excited about what we might accomplish for our area by this co-operative effort.

Regards,
Mary Lou Peterson

3

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

Ecological Services
Federal Building, Room 3035
316 North 26th Street
Billings, Montana 59101-1396

IN REPLY REFER TO:

Shadle JWS
Brooks

ES-61410

March 13, 1986

Mr. James F. Rathbun
Forest Supervisor
Kootenai National Forest
506 U.S. Highway 2 West
Libby, Montana 59923

Dear Mr. Rathbun:

We have been requested through channels to respond directly to you concerning the Forest Service's intent to prepare an EIS for noxious weed control in the Kootenai National Forest, Montana. The noxious weed problem in many areas of Montana (including Federal lands) is severe and some control in preventing the spread and encroachment of noxious weeds into adjacent, non-infected areas appears necessary. However, we are concerned about the impacts of weed control on wetlands, riparian habitats, stream systems and other fish and wildlife habitats. Accordingly, we support preparation of an EIS.

The FWS is very interested in the mechanism (including issues and considerations) used to identify target areas. We are also interested in the controlling or limiting factors which must be included in the evaluation of the control method selected and whether this varies with habitat types, (e.g. areas near wetlands, floodplain habitats, nearness to water and so forth). Accordingly, we would appreciate an opportunity to be involved in these particular aspects of the scoping process.

An informal contact in this office is [redacted] phone 585-6750).

Sincerely,

John G. Wood
Field Supervisor
Ecological Services

cc: USFWS/FC, Washington D.C.
ARD, USFWS, Denver, CO (HR-60120)
Rob Stewart, DOI, RFO, Denver, CO
Larry Lockard, USFWS, Kalispell, MT (ES)

4

MAR 17 1986

TO: Montana National Forests

Brooks CFB

FROM: Montana Wilderness Association
RE: Noxious Weeds on public lands
March 12, 1986

Dear Forest Service Weed Control Team;

The Montana Wilderness Association is extremely concerned about the rapid spread of noxious weeds on public lands in Montana. We therefore welcome the chance to review and comment on your weed control plan and Environmental Impact Statement for your particular National Forest.

Would you please send a copy of your draft EIS and noxious weed control plan to me as soon as possible.

Our primary concern is that processes are set out which will insure that the Forest Service begin an integrated approach to controlling noxious weeds. We therefore feel an integrated weed control education program for field personnel should be developed to keep personnel familiar with current weed research, development, and implementation. Also, there needs to be emphasis that weed control can be attained using methods other than herbicides.

Our main area of concern is that an effective noxious weed program is developed for your National Forest. We would like to see a multi-year program which can be monitored annually and will control the spread of noxious weeds.

The effective of a weed control program will hinge on how vigorously the Forest Service pursues it. All field personnel must be educated about the seriousness of the weed problem. The leader of the weed control program must take the initiative to make sure the program is a success.

Sincerely,

Charles H. Rueiske

5

EPA

REF: 8MO

June 23, 1986

James F. Rathbun
Forest Supervisor
Kootenai National Forest
506 U. S. Highway 2 West
Libby, Montana 59923

Re: Draft EIS -- Kootenai National Forest, Rexford and Yaria Districts, Noxious Weed Control Program

Dear Mr. Rathburn:

In accordance with our responsibilities under the National Environmental Policy Act and Section 309 of the Clean Air Act, the Environmental Protection Agency (EPA) Region VIII Montana Office has reviewed the referenced document.

1. The document has been discussed with personnel in the Montana Department of Agriculture, Environmental Management Division. EPA feels that their technical comments adequately reflect our general position on the proposed noxious weed control program.

2. All pesticide applications must be made by certified applicators or operators. This will help to ensure that the applications will be made safely and properly.

3. EPA supports the decision to use an integrated pest management alternative rather than selecting a strict chemical approach.

EPA rates this DEIS - EC-1 (Environmental concerns - statement acceptable).

Thank you for providing this opportunity for our review and comment. If you have any questions regarding the above comments, please call me at 449-5432 or Richard Montgomery of my staff at 449-5486.

Sincerely,

John F. Wardell, Director
Montana Office

cc: Dale Wendhost, EPA-EA

6

Cooperative Extension Service

MONTANA STATE UNIVERSITY U.S. DEPARTMENT OF AGRICULTURE AND MONTANA COUNTIES COOPERATING

June 3, 1986

Jim Rathbun
United States Forest Service
Kootenai National Forest
506 U.S. Hwy. 2, W.
Libby, Montana 59923

Dear Jim:

Thank you for the opportunity to comment on the Draft Environmental Impact Statements for the Kootenai National Forest Noxious Weed Treatment Program. It was well prepared and we commend you and your staff for the effort.

Lincoln County and the Lincoln County Weed and Rodent Control Board is charged by the State of Montana with directing the Noxious Weed Program in Lincoln County. In addition to state law, the threat to our natural resources by noxious weeds such as Spotted Knapweed and Leafy Spurge warrants a concerted effort, by all, to control or minimize their spread on we do not have large acreages of invasion plant monocultures.

The Lincoln County Noxious Weed Management Plan identifies goals for management of noxious weeds in Lincoln County. Briefly these include 1) Prevent the introduction of, or eradication of noxious weeds not currently present in Lincoln County. 2) Eradicate or severely limit rangeland weeds in drainages where this is possible and 3) contain noxious weeds within drainages where it is widespread. Operationally, this translates to a program of preventing the spread of noxious weeds into new areas and, planting in the Tobacco Valley area, elimination of noxious weeds by drainages.

Noxious weed control is a long term on going effort. Given the problem in Lincoln County with noxious weeds, alternative #3 is in no way acceptable. It is very questionable if that alternative is in compliance with either state or federal law. Alternative #1 is the preferred approach simply because it allows the United States Forest Service to do a cost effective job of elimination of noxious weeds in those areas where that priority exists. Either alternative #1 or #2 allows the Kootenai National Forest to identify noxious weeds as natural resource pests and implement actions to prevent their spread.

Thank you again for the opportunity to comment. We hope this lends to a more aggressive posture on the part of the United States Forest Service which shows a positive position as stewards of our lands.

Sincerely,

Robert L. Wilson
Lincoln County Agent
Secretary, Lincoln County Weed and Rodent Board

RLW:mw

The programs of the Montana Cooperative Extension Service are available to all people regardless of race, color, sex, or national origin.

7

DEPARTMENT OF HIGHWAYS

STATE OF MONTANA

June 11, 1986

James F. Rathbun, Forest Supervisor
Kootenai National Forest
P.O. Box 666
Libby, MT 59917

ROXIOUS WEED CONTROL
PROGRAM AND TREATMENT PROGRAM
DRAFT ENVIRONMENTAL IMPACT STATEMENT

Thank you, Mr. Rathbun, for the opportunity to review the above captioned EIS.

The Montana Department of Highways has no additional comments to add to these documents.

Bob Connor

BOB CONNOR, SUPERVISOR
NOXIOUS WEED CONTROL SECTION

WC:BC:jm:477

8

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Endangered Species, Field Office
Federal Bldg., U.S. Courthouse
301 South Park
P.O. Box 10023
Helena, Montana 59626

IN REPLY REFER TO:
ES: Noxious Weed Control,
Kootenai NF

May 7, 1986

James Rathbun, Forest Supervisor
Kootenai National Forest
P.O. Box 666
Libby, MT 59923

Dear Jim:

We have reviewed the Draft Environmental Impact Statement prepared for the Noxious Weed Treatment Program on the National Forests Facing Ranger Districts of the Kootenai National Forest and concur with the no effect conclusion for endangered and threatened species.

Your interest and cooperation in meeting our joint responsibility under the endangered species act is appreciated.

Sincerely,

Wayne G. Brewster
Field Supervisor
Endangered Species

cc: MS, FWS, Billings, MT

STATE OF MONTANA
DEPARTMENT OF AGRICULTURE
[illegible]
[illegible]
[illegible]

June 13, 1984

Mr. James F. Hathburn
Forest Supervisor
Kootenai National Forest
506 Highway 2 West
Libby, MT 59923

Dear Mr. Hathburn:

Montana's Interagency Planning Task Force has reviewed and made the enclosed comments on the Draft Environmental Impact Statement (DEIS) for the Kootenai National Forest Noxious Weed Treatment Program. We support the use of all feasible methods described in the preferred alternative to control noxious weeds on the Kootenai National Forest.

We look forward to your consideration of our comments and your response to them in the final EIS. We appreciate your agency's attempts to deal with the noxious weed problem on the Kootenai National Forest.

Sincerely,

Keith Kelly
Director

JCL/fl-mdeis.wa
Enclosure

An Affirmative Action/Equal Employment Opportunity Employer

Thank you for the opportunity to review the Kootenai National Forest Noxious Weed Treatment Program DEIS. The DEIS provided an objective discussion of control and economic impacts that may result from each of the alternatives. The DEIS indicates that Kootenai National Forest officials have a very good grasp of the weed problem on the Forties and Rexford Ranger Districts since the DEIS lists the target weeds and their locations.

We generally support the preferred alternative (Alternative 1), which emphasizes Integrated Pest Management (IPM) of noxious weeds. The emphasis on preventative measures is appropriate. Early detection and treatment of invading weed species is essential for successful weed management on forests and rangeland. Judicious use of herbicides will be required pending the development of more sophisticated biological and cultural control methods. Existing biological, mechanical and cultural control methods should be used where appropriate. The eradication of small infestations and gradual reduction of larger infestations are appropriate goals.

1. Prevention of weed infestations. The best method of weed management is to prevent the initial establishment of weeds, as discussed in the DEIS. Weed prevention techniques should be used in all areas of the forest. All heavy logging, road construction or oil exploration equipment (ie. skidders, yardees, tractors, drilling rigs, etc.) that operates on Forest Service land should be washed to remove weed seeds before entering the Kootenai National Forest. Activities that disturb the soil

should be minimized to reduce the spread of weeds, and all disturbed sites should be revegetated. Newly-constructed roads should be closed to public use until permanent vegetative cover is established along roadsides, and off-road vehicle use should not be allowed on weed-free areas.

Immediate action should be taken to prevent noxious weeds from invading back country and proposed wilderness areas. This includes controlling weeds along roadsides and trailheads, educating users about noxious weeds, and allowing only certified weed-free feed for animals to be taken on Forest Service land.

2. Public information and education. The Forest Service should establish a strong, long-term weed education program and address this educational effort in the DEIS. In addition to programs on weed identification and control for all field personnel, a weed education and awareness program targeted at the general public is needed. Public information and education activities might include weed identification publications, posters, meetings, public service announcements and other educational efforts to increase public awareness of the weed problem. Informed citizens could also provide a good source of information about weed infestations on Forest Service land.

Public notification of herbicide applications in developed recreation areas should emphasize the weed problem. In addition to being informed that an area has been sprayed, the public

should have why the area was sprayed.

3. Environmental concerns. We approve of constraints against herbicide application where runoff is likely to enter state waters. However, appropriate buffer zones should be determined on a case-by-case basis. Potential problems associated with spills and application of herbicides near water should be considered before a project begins. Labeling precautions that prevent contamination of ground water must also be observed.

Herbicide application techniques are extremely important in minimizing the impact of any herbicide to a sensitive environment. Wick applicators, controlled droplet applicators, and other hand-held equipment will minimize damage to nontarget vegetation.

Fish toxicity of the herbicides that are proposed for use depends on fish size, the amount of exposure and the toxicity of the product. Fisherm is hazardous to treat dry and appears moderately toxic, rather than slightly toxic to cold water fish.

Forest Service applicators must choose the most appropriate herbicide for each individual site. All labeling directions and precautions must be carefully followed. When choosing among different herbicides, their persistence and mobility in the environment and their toxicity and hazard to fish and wildlife should be considered. If two or more herbicides are equally effective against target weeds, the product with the least

potential for environmental damage should be used.

Personnel charged with control of noxious weeds should review state and federal regulations concerning proper disposal of pesticides and pesticide containers. Any waste products should be disposed of in accordance with applicable state regulations.

4. Human health. The analysis of the effects of the noxious herbicides on human health was very thorough. However, the metabolism of picloram is only partially understood. Benzilization to 2,4-D and picloram mixtures has occurred in humans, and the DEIS should recognize that applicators may develop allergic reactions from repeated exposure.

The discussion about the toxicology of herbicides that are proposed for use needs considerable clarification. Dicamba is not generally nonbasic, as stated in the DEIS, but has varying degrees of toxicity to different species depending on the dose or amount of exposure. The LD50 measures the relative toxicity of a pesticide, and products with low LD50 values are more toxic to a particular species than products with high LD50 values. Similarly, if picloram has a low LD50 for cattle and a high LD50 for rats, it is more toxic to cattle than rats. The No Observable Effect Level (NOEL) is the highest dose that does not produce a particular toxic effect in a test population. It is the threshold below which a toxic effect is not observed. The NOEL or threshold values vary for different toxic effects like kidney damage, liver damage, birth defects, reproductive effects, etc. These values may also vary dramatically among different species, so appropriate safety factors should be included when determining acceptable levels of exposure to humans. However, such thresholds may not exist for toxic effects that result from genetic changes such as cancer mutations.

3. Grazing management. The DEIS should evaluate the potential of improved range management practices to deter noxious weed invasion and to prevent the spread of noxious weeds within grazing allotments. The possibility of using grazing management to improve range condition, to improve native plant cover and vigor, and to provide increased plant competition with noxious weeds should be investigated. Improved grazing practices should be specifically described in the plan.

6. Biocontrol. The potential use of biocontrols fungus exists on both spotted knapweed and Canada thistle if the host range can be narrowed to target weeds. Past research on leafy spurge rust and other pathogens might also be mentioned in the DEIS.

7. Cooperative weed control. The noxious weed list should be expanded to include those weeds listed by the Montana Department of Agriculture in ARM 4.5.202-203. Although all weeds on the list need not be considered high priority or targeted plants, criteria for detection and management of all these species should be addressed. This will help coordinate the Kootenai National Forest Noxious Weed Treatment Program with county noxious weed

management plans.

Cooperative weed control efforts involving all adjoining landowners are essential. We appreciate the commitment to a coordinated weed control program involving the local county weed boards and state and private landowners. The commitment to a cooperative weed control program should make the proposed action very effective.

Response:

Item 1 - Preventative actions outlined in Chapter 2, page 5 and 6, have been pursued with members of the Lincoln County Weed Board, Department of State Lands, Champion International, Burlington Northern, and representatives of area ranchers and Christmas tree growers.

Item 2 - A public education program has been initiated, beginning with grazing permittees and Forest personnel. The education/awareness program will be extended to include recreationists and local public, via outlets such as posters, bulletin boards, and personal contacts by Forest officers and campground hosts.

Item 3 - Environmental concerns such as protection of water, accidental spills, and minimizing impacts of applications were considered when the method of treatment was decided on for each proposed action. All safeguards and label instructions will be followed as required by both the State and Forest Service directives.

Item 4 - Clarification of the definition of NOEL has been inserted in Chapter 4, page 22. The reference to Dicamba as being generally non-toxic to a wide variety of non-target organisms was derived from the summary discussion of Dicamba in the Pesticide Background Statement Volume 1. Agriculture Handbook Number 633. Page D1-3.

Item 5 - Noxious weed control has been addressed in the current allotment management plans, and will continue to be addressed in all new or revised AMP's.

Item 6 - Reference to Sclerotinia fungus was incorporated into Chapter 2, page 8.

Item 7 - A noxious weed list was included under Description of Additional Weeds Considered Noxious in the State of Montana. Page 3.

GLOSSARY

ADSORPTION: Adhesion of substances to the surfaces of solids or liquids; technically, the attraction of ions of compounds to the surfaces of solids or liquids.

ADVANCING HEADCUT: An erosional process in which the vertical erosion face (headcut) moves upslope or up a drainage.

ALLEOPATHIC: Pertaining to the suppression of growth of one plant species by another through the release of toxic substances.

ALLUVIAL DEPOSITS: Deposits of sand, gravels, and cobbles resulting from the reduction in carrying capacity of flowing water. As flowing water slows, its carrying capacity drops, allowing material to settle out.

AMINE: Any of a group of chemical substances derived from ammonia in which one, two, or three hydrogen atoms have been replaced by one, two, or three hydrocarbon groups.

ANIMAL UNIT MONTH (AUM): The amount of forage needed to sustain one cow and a calf (6 months old or younger) or their equivalent for 1 month.

ANNUAL PLANT: A plant that completes its life cycle within a year.

AUTHORIZED OFFICER: A designated Federal regulatory agency employee responsible for activities involving the use of public lands or delegated to exercise authority over grants for use of these lands.

BATHOLITH: A great mass of intruded igneous rock that for the most part stopped in its rise a great distance below the surface.

BETA CAMERA ANALYSIS: A method of analyzing movement of a radioactive isotope by recording on film the emittance of beta rays over a time interval.

BIENNIAL PLANT: A plant that completes its life cycle in 2 years.

BIOACCUMULATION: The accumulation of a substance in an ecosystem. A chemical that does not bioaccumulate, decomposes rapidly in the environment.

BIOASSAY: The testing of the effects of chemical substances on live organisms under controlled conditions.

BIOLOGICAL CONTROL: The use of natural enemies to attack a target plant, retard growth, prevent regrowth, or prevent seed formation.

BOOM (HERBICIDE SPRAY): A tubular metal device that conducts a herbicide mixture from a tank to a series of spray nozzles. A boom may be mounted beneath an aircraft or behind a tractor.

BROADCAST APPLICATION: The applying of herbicide over an entire area or field rather than only to rows, beds, or individual plants. See SPOT TREATMENT.

BROWSE: That part of a leaf and twig growth of shrubs, woody vines, and trees on which browsing animals can feed; to consume browse.

BUFFER (STRIP OR ZONE): A zone left untreated with herbicide (at the outer edge of a treated area or along streams) as protection against the effects of treatment.

CARBON 14 DATING: A method of dating archaeological and geological materials through the measurement of carbon 14—a heavy isotope of carbon of mass number 14.

CARCIOGENIC: A substance producing or inciting cancer.

CATEGORICAL EXCLUSION: A category of actions that do not individually or cumulatively have significant effects on the human environment and for which neither an environmental assessment nor an environmental impact statement is required.

CHEMICAL DEGRADATION: The breakdown of a chemical substance into simpler components through chemical reactions.

COLIFORM: A group of bacteria that normally abound in the intestines of humans and other warm-blooded animals and are used as an indicator of sanitary quality in water.

CONTACT SYSTEMIC HERBICIDE: A herbicide applied directly to a plant, which is absorbed in its leaves and then translocated throughout the plant.

CONTROL: Reduction of a pest problem to a point where it causes no significant economic damage.

CREEPING PERENNIALS: Perennial plants that spread by means of specialized modified above-ground stems (stolons) or below-ground stems (rhizomes) as well as by seeds. Because of their method of spread, creeping perennial noxious weeds are the most difficult to control.

CRITICAL HABITAT: (1) Specific areas within the habitat occupied by a species at the time it is listed under the Endangered Species Act where there are physical or biological features (i) essential to the conservation of the species and (ii) that may require special management considerations or protection, and (2) specific areas outside the habitat occupied by the species at the time it is listed upon the determination by the Secretary of the Interior that such areas are essential for the conservation of the species.

CRUCIAL WILDLIFE HABITAT: An area of habitat essential to the survival of any wildlife species sometime during its life cycle.

CULTURAL RESOURCES: Remains of human activity, occupation, or endeavor, reflected in districts, sites, structures, building, objects, artifacts, ruins, works of art, architecture, and natural features that were of importance in past human events. Cultural resources consist of (1) physical remains, (2) areas where significant human events occurred, even though evidence of the events no longer remains, and (3) the environment immediately surrounding the actual resource.

DERMATITIS: Inflamation of the skin.

DNA (DEOXYRIBONUCLEIC ACID): Any of the nucleic acids that are the molecular basis of heredity in many organisms.

DOSAGE: The regulation of doses; how often and for how long.

DOSE: The amount of chemical administered at one time.

DRIFT: The movement of airborne herbicide particles by air motion or wind away from an intended target area.

DRIP TORCH: A container of slash-burning fuel equipped with a wick to ignite the fuel mixture as it drips from the container onto the slash. Handheld torches have a 1.5-gallon capacity and are ignited by a fiber-filled, fuel-soaked wick. The torch used by a helicopter has a 30- to 55-gallon capacity and is equipped with an electrically activated fuel pump and ignition.

ECOLOGICAL NICHE: The physical space in a habitat occupied by an organism; its functional role in a community; and its position in environmental gradients of temperature, moisture, pH, soil, and other conditions of existence.

ENDANGERED SPECIES: Plant or animal species that are in danger of extinction throughout all or a significant part of their range. See THREATENED SPECIES.

ENVIRONMENTAL ASSESSMENT (EA): A systematic environmental analysis of site-specific activities used to determine whether such activities would significantly affect the human environment and whether an environmental impact statement is required.

ENVIRONMENTAL IMPACT STATEMENT (EIS): An analytical document developed for use by decisionmakers to weigh the environmental consequences of a potential action.

EPHEMERAL STREAM: A stream that flows only in direct response to precipitation and whose channel is at all times above the water table.

ESTER: A substance formed by the reaction between an acid and an alcohol, usually with the elimination of water.

EXCHANGE: A transaction in which the Federal government receives land or interests in land in exchange for other land or interests in land.

EXOTIC PLANTS: Plants that are not native to the region in which they occur.

FATE (HERBICIDE): What happens to a herbicide after it is applied, including leaching, photodecomposition, and microbial degradation.

FETOTOXIC: Toxic to a fetus.

FOOD CHAIN: A series of plant or animals species in a community, each of which is related to the next is a source of food.

FORAGE: All browse and herbaceous foods available to grazing animals. Forage may be grazed or harvested for feeding.

FORB: A low-growing herbaceous plant that is not a grass, sedge, or rush.

GELLED GASOLINE: A slash-burning fuel mixture containing an aluminum soap or fatty acid (alumagel) and gasoline. This gelling additive is mixed with gasoline at the rate of 7 pounds per 35 gallons.

GROUND COVER: Grasses or other plants that keep soil from being blown away or washed away.

HABITAT: The environment in which an organism occurs.

HALF-LIFE: The time required for half the amount of a herbicide introduced into a living system to be eliminated or disintegrated by natural processes.

HECTARE: 10,000 square meters or about 2.47 acres.

HERBACEOUS: Having little or no woody tissue and usually persisting for a single season.

HERBICIDE: A substance used to inhibit or destroy plant growth. If its effectiveness is restricted to a specific plant or type of plant, it is called a selective herbicide. If it is effective for a broad range of plants, it is called nonselective.

HERBIVORE: An animal that exclusively eats plants.

HISTOPATHOLOGIC: Pertaining to tissue changes characteristic of diseases.

INFILTRATION: The downward entry of water into the soil.

INSULT: Injury to the body or one of its parts or something that causes or has a potential for causing such injury.

INTEGRATED PEST MANAGEMENT: Use of several techniques (for example, burning, grazing and mechanical, manual, or chemical methods) as one system to control animals or plants where they are unwanted.

INTERMITTENT STREAM: A stream that flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow.

IN VITRO: Outside the living body and in an artificial environment.

LABEL: All written, printed, or graphic matter on or attached to herbicide containers as required by law.

LC_{50}: A lethal herbicide concentration rate at which 50 percent of test animals will be killed. It is usually used in testing of fish or other aquatic animals.

LD_{50}: The dosage of toxicant (expressed in milligrams of toxicant per kilogram of animal body weight) required to kill 50 percent of the animals in a test population when given orally.

LEACHING: The movement of chemicals through soil by water or the movement of herbicides out of leaves, stems, or roots into the air or soil.

LIVESTOCK PERFORMANCE: The gaining of weight by livestock.

LOESS: Soil material carried and deposited by the wind, consisting predominantly of silt-sized particles.

METABOLISM: The chemical processes in living cells by which new material is assimilated and energy is provided for vital processes.

METABOLITE: Any substance taking part in or produced by metabolism.

MICROBIAL DEGRADATION: The breakdown by bacteria of chemical substances into simpler components.

MICROCLIMATE: Climatic conditions characteristic of a small area. Microclimates are influenced by local geography and vegetation and may differ from regional climate in temperature, wind, length of growing season, and precipitation.

MICROGRAM: One millionth of a gram.

MOBILITY (HERBICIDE): The capability of a herbicide to be moved easily within soil, vertically or laterally, with the normal movement of water.

MULTIPLE USE: The harmonious use of land for more than one purpose, not necessarily the combination of uses that will yield the highest economic return.

MUTAGEN: A substance that tends to increase the frequency or extent of genetic mutations (changes in hereditary material).

MYONEURAL: Of or relating to both muscle and nerve.

MYOTONIA: Tonic spasm of one or more muscles or a condition characterized by such spasms.

NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS): The allowable concentrations of air pollutants in the air specified by the Federal government in Title 40, Code of Federal Regulations, Part 50. The air quality standards are divided into primary standards (based on the air quality criteria and allowing an adequate margin of safety requisite to protect public health) and secondary standards (based on the air quality criteria and allowing an adequate margin of safety requisite to protect the public welfare from any unknown or expected adverse effects of air pollutants). Welfare includes effects on soils, water, crops, vegetation, manufactured materials, animals, wildlife, weather, visibility, and climate; damage to and deterioration of property; hazards to transportation; and effects on economic values and on personal comfort and well being.

NATIONAL REGISTER OF HISTORIC PLACES: The official list established by the historic Preservation Act of 1966, of the nation's cultural resources worthy of preservation. The Register lists archaeological, historic, and architectural properties (districts, sites, buildings, structures, and objects) nominated for their local, state, or national significance by state and Federal agencies and approved by the National Register Staff. The Register is maintained by the National Park Service.

NATIONAL TRAILS SYSTEM: A network of nationally significant trails consisting of (1) scenic, extended trails that provide outdoor recreation opportunities and conserve nationally significant scenic, historic, natural, or cultural qualities of areas through which they pass, and (2) recreation trails that provide a variety of outdoor recreation uses in or reasonably near urban areas.

NATIONAL WILD AND SCENIC RIVERS SYSTEM: A system of nationally designated rivers and their immediate environments that have outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, and other similar values and are preserved in a free-flowing condition. This system consists of three types (1) Recreation—rivers or sections of rivers readily accessible by road or railroad that may have some development along their shorelines and that may have undergone some impoundment or diversion

in the past; (2) Scenic—rivers or sections of rivers free of impoundments, with shorelines or watersheds still largely undeveloped but accessible in places by roads; and (3) Wild—rivers or sections of rivers free of impoundments and generally inaccessible except by trails, with watersheds or shorelines essentially primitive and waters unpolluted.

NEUROPATHY: An abnormal and usually degenerative state of the nervous system or nerves.

NONTARGET VEGETATION: Vegetation that is neither expected nor planned to be affected by herbicide treatment.

NO OBSERVED EFFECT LEVEL (NOEL): (1) the lowest dose of a substance by any route other than inhalation that has been found by experiment with animals to have no toxic effect on the animals or (2) the lowest concentration of a substance in air that has been found by experiment with animals to have no toxic effect on the animals exposed for a defined time.

NOXIOUS WEED: According to the Federal Noxious Weed Act (PL 93-629), a weed that causes disease or has other adverse effects on man or his environment and therefore is deterimental to the agriculture and commerce of the United States and to the public health.

ORGANOGENESIS: The formation of organs in animals.

OUTSTANDING NATURAL AREA: A natural area established to preserve scenic values and areas of natural wonder.

PALEONTOLOGY: A science dealing with life of past geological periods as known from fossils.

PARTICULATES: Finely divided solid or liquid particles in the air or in an emission, including dust, smoke fumes, mist, spray, and fog.

PATHOGEN: A specific causative agent of disease, such as a bacterium or virus.

PERENNIAL PLANT: A plant that completes its life cycle in more than 2 years.

PERENNIAL STREAM: A stream that flows continuously year round.

PERSISTENCE: The resistance of a herbicide to metabolism and environmental degradation and thus a herbicide's retention of its ability to kill plants for prolonged periods.

PETIOLE: A slender stem that supports the blade of a foliage leaf.

pH: A numeric value that gives the relative acidity or alkalinity of a substance on a 0 to 14 scale with the neutral point at 7.0. Values lower than 7.0 show the presence of acids, and values greater than 7.0 show the presence of alkalis.

PHOTODECOMPOSITION (PHOTODEGRADATION): The breakdown of a substance, especially a chemical compound, into simpler components by the action of sunlight.

PHOTOSYNTHESIS: Formation of carbohydrates in the tissues of plants exposed to light.

PHYTOTOXIC: Poisonous to plants.

PRESCRIBED BURNING: The scientific, intentional burning of wildland fuels in either their natural or modified states under conditions to allow the fire to continue to a predetermined area and to produce the intensity of heat and rate of spread needed to meet certain objectives.

PRIORITY AREA: An area, usually in excess of 10 acres, infested with noxious weeds which has (1) been treated perpherally and shows an indication that control action on the interior will be effective, or (2) the possibility of facilitating greater noxious weeds spread by Forest users, animals, water or wind, or (3) the possibility of improving treatment effectiveness by coordinating with other control efforts, or (4) the possibility of improving treatment effectiveness by taking advantage of climatic and seasonal conditions.

RADIOLABELLING: A method of creating a radioactive isotope by bombarding a particle with beta or gamma rays. This method is used to trace the movement of particles in fluids.

RAPTORS: Birds of prey, such as owls, hawks, or eagles.

RESEARCH NATURAL AREA: A physical or biological unit in which current natural conditions are maintained insofar as possible. In such areas, activities such as grazing and vegetation manipulation are prohibited unless they replace natural processes and contribute to the protection and preservation of an area. Such recreation activities as camping and gathering plants are discouraged.

RHIZOME: An underground root-like stem, that produces roots and leafy shoots and provides a means for some plants to reproduce.

RIPARIAN: Pertaining to or located along a streambank or other water bodies, such as ponds, lakes, reservoirs, or marshes.

RISK: The probability that a substance will produce harm under specified conditions.

ROSETTE: A cluster of leaves in crowded circles or spirals arising basally from a crown or apically from an axis with greatly shortened internodes.

RUNOFF: The part of the precipitation in a drainage area that is discharged from the area in

stream channels, including surface runoff, ground water runoff, and seepage.

SCOPING: The process by which significant issues relating to a proposal are identified for environmental analysis. Scoping includes eliciting public comment on the proposal, evaluating concerns, and developing alternatives for consideration.

SEDIMENTATION: The process or action of depositing sediment.

SENSITIVE SPECIES (PLANTS): Plant species not officially listed as threatened or endangered but that are undergoing a status review or are proposed for listing by either Federal Register notices published by the Secretary of the Interior or the Secretary of Commerce or by comparable state documents.

SOIL COMPACTION: The compression of the soil profile from surface pressure, resulting in reduced air space, lower water-holding capacity, and decreased plant root penetrability.

SOIL COLLOID: An extremely small particle of clay or organic matter that exposes a large surface area on which some herbicides are absorbed.

SOIL PRODUCTIVITY: The capacity of a soil in its normal environment to produce a specified plant or sequence of plants under a specified system of management.

SOIL PROFILE: A vertical section of soil that shows all horizons and parent material.

SORPTION: The process of taking up or holding by either absorption or adsorption.

SOIL TREATMENT: Applying herbicide to a selected individual area as opposed to broadcast application.

STREAM CLASSES: Four classes of streams defined by present and foreseeable uses made of the water and potential effects on onsite changes on downstream uses. Because importance of use is relative to the general area, size is not necessarily a criterion for classification. Whole streams or parts of streams can be classified, and one stream may have sections in different classes.

Class I - Perennial or intermittent streams or segments that have one or more of the following characteristics: (1) are a direct source of water for domestic use (cities, recreation sites); (2) are used by large numbers of fish for spawning, rearing, or migration: (3) have enough water flow to greatly influence water quality of a Class I stream.

Class II - Perennial or intermittent streams or segments that have one or both of the following characteristics: (1) are used by moderate though significant numbers of fish for spawning, rearing, or migration; (2) have enough water flow to have only a moderate and not a clearly identifiable influence on downstream quality of a Class I stream or have a major influence on a Class I stream.

Class III - All other perennial streams or segments not meeting higher class criteria.

Class IV - All other intermittent streams or segments not meeting higher class criteria.

SUSPENDED SEDIMENT: Very fine soil particles that for long periods of time are maintained in suspension in water by turbulent currents or as colloids.

SUSTAINED YIELD: Achieving and maintaining a permanently high level, annual or regular period production of renewable land resources without impairing the productivity of the land and its environmental values.

TERATOGEN: A substance tending to cause development malformations in unborn human or animal offspring.

TERATOGENESIS: Birth defects.

THREATENED SPECIES: Plant or animal species that are not in danger of extinction but are likely to become so within the foreseeable future throughout all or a significant portion of their range. See ENDANGERED SPECIES.

TISSUE BURDEN: The cumulative effects of a substance on a particular tissue.

TOLERANCE: Acceptable level of pesticide residues.

TOTAL DISSOLVED SOLIDS (TDS): An aggregate of carbonates, bicarbonates, chlorides, sulfates, phosphates, and nitrates of calcium, magnesium, manganese, sodium, potassium, and other cations that form salts. High TDS solutions can change the chemical nature of water, exert varying degrees of osmotic pressure, and often become lethal to life in an aquatic environment.

TRANSLOCATION: The transfer of substances from one location to another in the plant body.

TUMORIGENIC: Causing tumors.

UNDERSTORY VEGETATION: Plants, usually grasses, forbs, and low shrubs, growing beneath the canopy of other plants.

UNGULATES: Hoofed mammals, most of which are herbivores and many of which have horns.

VAPOR PRESSURE: The pressure at which a chemical compound will evaporate.

VASCULAR PLANT: A plant that has a specialized conducting system consisting of xylem and phloem.

VISUAL INTRUSION: A feature (land, vegetation, structure) that is generally considered out of context with the characteristic landscape.

VISUAL RESOURCE MANAGEMENT (VRM): The planning, design, and implementing of management objectives to provide acceptable levels of visual impacts for all resource management activities.

WATER TABLE: The upper limit of the part of the soil or underlying rock material that is wholly saturated with water.

WEED: A plant out of place or growing where not desired.

WEED-INFESTED ACRE: Any part of an acre of land that is infested with weeds.

WILDERNESS: An area designated by Congress as part of the National Wilderness Preservation System. Wilderness areas are generally undeveloped Federal lands that retain their primeval character and influence without improvements or human habitation.

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